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EDITORIAL.

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CONTAGIOUS EPITHELIOMA OF BIRDS.—Although this disease is quite familiar to many of our readers, I may extract from the review that I read on the subject in the *Journal de Zootechnie* by Mr. Roquet, if not the whole subject, at least some part which may be of greater interest.

Epithelioma Contagiosum, *Molluscum Contagiosum*, or plainly the Contagious Epithelioma of birds, is a special contagious disease of the skin characterized by the presence of epithelial tumors, varying in size from that of the head of a pin to that of a hazel nut and localized principally on featherless parts of the head.

This disease presents, with eruptive affections of man and of animals, analogies which have caused it to be called by some *Aviary Variola*. It was even believed years ago that epidemics of human smallpox had for its origin the epidemics of variola in birds. To the anatomo-pathological point of view, it offers also undoubtful similarities with epithelial cancer: the presence of inclusions, in the epithelial cells, found also in most of eruptive diseases and in some epitheliomas have served to establish the parasite origin of the tumors. At the present time and since

the researches of Marx and Sticker in 1902, it is admitted that the virus is a filtering ultra-microscopic microbe.

General consideration on the etiology is deserving attention. In 1865 Rivolta was the first to describe in the lesions of the disease intracellular formations similar to those that Virchow had already studied in the *Mollusum Contagiosum* of man, and he considered them as parasites.

With Silvestrini, he assimilated them to coccidies, even calling those met in the lesions of the heads of fowls *Psorosperma Crouposum*, and considered the disease as a cutaneous psorosperma. In 1873 Bollinger insists upon the anatomical aspect of the lesions and classes them with epitheliomatous eruptions. For him, it is closely related to *Mollusum Contagiosum* of man or the Follicular Psorosperma described by Darier. Marx and Sticker in 1902 demonstrated that the liquid obtained by crushing a tumor from a hen in physiological water and filtering it on a Berkefeld, was virulent. This fact was confirmed in 1904-1905 by Juliusberg with tumors of pigeons and for mollusum of man.

In 1904 Borrel advances the idea of the bacterian nature of the intracellular inclusions, in which he had observed numerous micrococci. Burnet in 1906 confirmed the same hypothesis. Recently several authors have considered the disease and the diphtheria of birds as two different aspects of a same disease, as it would have the same virus for both. This conclusion is supported by Schmidt. For him, if diphtheritic membranes are inoculated into a great number of fowls, on the mucous membranes or on the skin, most of them will contract only the ordinary diphtheria, but some will have the typical lesions of *Mollusum Contagiosum*.

In 1909 Bordet and Fally, in a series of experiments, by inoculating diphtheritic products have obtained always diphtheria and never contagious epithelioma. For Gratia, leaving aside the contagion, he believes that there is not any connection between the two diseases to the clinical nor the anatomo-pathological point of view. However for Uhlmutz and Manteufel the causal

agent of aviary diphtheria and of contagious epithelioma is the same; both affections constitute a single morbid entity which varies only in its localization.

In his review, Mr. Roquet continues with the consideration of the clinical symptoms of the natural affection and then the



CONTAGIOUS EPITHELIOMA
OF A PIGEON.

Experimental disease obtained after
several days of incubation.

(Photo by M. Auger.)

manifestations of the experimental disease, *Epithelioma Contagiosum* being an excellent one for study when pigeons are taken as subjects for experimentation.

Indeed, to inoculate a healthy bird, it is sufficient to scarify or make slight excoriations on the skin and then rub the part

directly with the excised tumor, with scabs scraped from it or with the fluid that is made by crushing them in a little water. After four or five days of incubation, the tumors will make their appearance. If extensive lesions are desired the feathers are pulled away from the neck of the bird, from the beak to the wings or from the throat to the cloacum and the whole surface is rubbed with a dilution of the virus. At the point of implantation of every feather a tumor will develop as shown in this plate. Intravenous inoculations will also give positive results and the ingestion of grain impregnated with virus has also been followed by the apparition of the disease.

The virus of contagious epithelioma exists in the epidermis in very great quantity. The very slightest solution of it, even if diluted two thousand times, will reproduce the disease, and its properties are kept for a long time, resisting for months and months. It is a filtering virus, says Burnet, but the results obtained with the Berkefeld bougies are not always the same. Some birds are enjoying natural immunity and all pigeons are not equally susceptible to the attack. Those that have recovered from spontaneous or experimental disease possess a very strong immunity, but only of short duration. Often after two months they are susceptible to become sick again. Anyhow the immunity varies. After a very severe eruption it is strong and lasting. After a short and benignant attack, it is limited and short. In this case reinoculation gives only a slight and short disease. Treated by heat, the virus does not give immunity whether injected by the skin or in veins, and no matter in what quantity it is administered. Only the living virus gives immunity. The microscopic examination of frottis from the eruptive tumors has shown gatherings of very fine granulations resembling very much the microbes of pleuro-pneumonia. They were microbes, extremely fine, filtering, isolated or grouped in diplococci, chains, or staphylococci and surrounded with a kind of mucous envelope. Their number is enormous and it explains the extraordinary abundance of the virus.

The treatment of this affection is simple. Its prophylaxy consists in avoiding the contact of animals among them. Thorough disinfection is very necessary but difficult to obtain. The therapeutic treatment is excision of the epithelial formations and cauterization with iodine or nitrate of silver.

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PRECIPITO-REACTION IN THE DIAGNOSIS OF TUBERCULOSIS. —Although tried already in 1907 by Bonome, this method has not yet entered largely in general practice, notwithstanding the various attempts which have been made in some countries for its introduction. The principles of the precipito-reaction or diagnosis rests on the production of anticorps, specific towards an antigene (in this case tuberculous bacilli), having given rise to an infection or having been used to immunize an animal. Anticorps may be classified in two great groups: some acting as coagulating (coagulines, principally the precipitines) and the others in dissolving (lysines).

Prof. Vallee and Mr. Finzi in their laboratory have worked up the method and the technic that they recommend is the following: 1. Take, by bleeding at the jugular vein with a trocar or a small syringe, a certain quantity of blood from the animal which is to be tested; leave it coagulate, until complete retraction of the clot, at the temperature of the laboratory; use only the serum which is supposed to contain the specific precipitines. 2. Select the antigene, which is either the bouillon which has been used for the culture of bovine bacilli; this is filtrated *on paper*, and to which may be added carbolic acid in the proportion of 2 per cent. 3. Mix in another test tube four parts of the serum and one of the filtered bouillon; mix in a second test tube, which will serve as control, serum and fresh normal bouillon in the same proportion; place the two test tubes in the autoclave at 38° from one to two hours, and then leave them at the temperature of the laboratory for at least the same length of time. 4. Examine them. If the animal from which the serum was obtained

is tuberculous, the contents of the first tube will be cloudy and then will have a precipitate, flaky and whitish. If he is free from tuberculosis, the mixture will remain clear. The control tube will never show any precipitate.

In the publication that was made by Prof. Vallee and Mr. Finzy they propose another method, simpler and as certain in its results. Instead of using bacillar bouillon, as antigene, they utilize the serum of a horse, hypervaccinated against human bacilli. One part of the serum to be examined is mixed in test tubes with two of hyperimmunized serum. Control tubes are likewise prepared and all are exposed to a heat of 38° for two hours as in the preceding method. When the serum tested comes from a tuberculous subject, a fine precipitate, which remains floating in suspension, is found in the corresponding test tube.

The results of the precipito-reaction by the two methods are extremely certain and univocal for the diagnosis in question; 107 animals have been tested (bovines, dogs, horses); their pathological condition, as far as tuberculosis went, was controlled, *a priori* (experimental tuberculosis) or *a posteriori* (tuberculine test or post mortem); forty-eight were tuberculous. The final indications were conclusive, with the difference that the intensity of the precipito-reaction varies according to the method used and the extent of the tuberculous lesions. For instance, while with limited and recent lesions of tuberculosis, the serum of the sick animal gives only a weak precipitate, with the bacillar bouillon, with the hyperimmunized serum the reaction is much more marked. With a tuberculous animal having extensive lesions, it is the opposite. The serum of bovines vaccinated against tuberculosis and resisting intravenous inoculations of very virulent bacilli, precipitates bacillar extracts, but not hyperimmunized serum. The precipito-reaction is specific. It is not obtained with animals that are not tuberculous, but which may, however, have another disease. It is principally negative with echinococcosis, and paratuberculous hypertrophying enteritis. And consequently, although of a practical limited application, it

must be recommended for the diagnosis of tuberculosis in dogs with which tuberculine gives such uncertain results. This method will also be advantageous when, notwithstanding the use of large doses of tuberculine with temperature registered immediately, and where the serial ophthalmo-reaction are so advantageous, there will be some litigious cases. And again in animals prepared by fraud to conceal or alter the results of the tuberculine tests, as in those cases where repeated injections of tuberculine have been made, the reaction instead of being concealed, is on the contrary considerably more marked. It is a valuable thing to remember.

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IMMUNIZATION AGAINST BOVINE TUBERCULOSIS.—As our readers know, official experiments have been carried out in the kingdom of Saxony by government order. These experiments were begun in 1904 and Prof. Doctor Edelmann, of Dresden, made his report some while ago and published it in the *Bericht Ueber das Veterinärwesen im Königreiche Sachsen*.

In 1904 it was first proposed to test the method of immunization preconized by Von Behring with the bovo-vaccine. But in 1906 Prof. Klimmer, of Dresden, having advocated the use of a new vaccine, the *Antiphymatol*, it was decided to test it also in these experiments. The operations were carried out upon 1,600 animals—600 being treated by Behring's method and 1,000 by Klimmer's.

The keeping condition of the animals varied very much. In two herds only all the animals were kept in the field from spring to fall as long as the weather permitted it. In most of the others the young animals only went to pasture in fields surrounding the farms. Some animals were kept working. Generally the young subjects were kept in pasture from four to five months. The hygiene was good. The calves were fed with milk from their mother for three weeks and later with mixed milk. The results of the vaccination by both methods are minutely detailed in the report with the results noted and the con-

clusions presented by Doctor Edelman, benevolent as they are, seem to condemn both methods by the following

Conclusions.—1. The inoculation of Von Behring's and Klimmer's vaccines are well supported by bovines.

2. An increase in the resistance of the vaccinated animals to the natural contagion of tuberculosis, compared with that of the non-vaccinated, has not been noticed.

3. A curative action of *Antiphymatol* upon tuberculous organisms has not been demonstrated by the indications furnished by tuberculine. Evident proofs have not been found in relation to the influence of antiphymatol upon the anatomo-pathological evolution of the tuberculous lesions.

4. A prophylaxy of tuberculosis of bovines by the methods of Von Behring or of Klimmer, without the addition of prophylactic hygienic measures against natural contagion, seems inefficacious.

5. It remains to be found out if the method of Klimmer, associated with some other hygienic measures, can be utilized. Of all the six hundred animals of the Behring's lot, four hundred and fifty were yet alive, and of the Klimmer's lot nine hundred remained in observation.

Decidedly, immunization remains yet an unsolved problem.

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TUMORS OF LOWER VERTEBRATES.—In reviewing in my last the excellent article of Prof. Petit on malignant tumors, I alluded to what he said relative to tumors in the lower class of animals, viz., that he had not carried his investigations yet in that direction. At the International Congress for the study of cancer, Mrs. Marianne Plebn, of Munich, made the following report on this question, which deserves some attention:

The existence of true tumors is at present recognized among reptiles, amphibian animals and fishes. In reptiles only benignant tumors have so far been found. In amphibians epitheliomas only are known to exist. But in fishes all the varieties of be-

nignant and malignant tumors, visceral as well as tegumentary, have been observed. The cutaneous carcinomas of the cyprinidæ, often extensive and spreading in tissues, are compatible with long life. On the contrary, benignant tumors of the gills kill rapidly by functional inability of these organs.

Malignant tumors are specially observed in old fishes, but have also been seen in some aged but one or two years. Living in freedom or in captivity, in sea or fresh water, seem to have no action on their development.

Some tumors appear in epidemic form such as the variola of carps, branchial epitheliomas of cyprinidæ, thyroidian epithelioma of salmonidæ. Mrs. Plebn has observed in young fishes spread and infiltrating tumors developed round parasite myxosporidæ. Mr. Gaylord, of Buffalo, has observed four epidemics of thyroidian tumors in salmonidæ. In one single breeding place, three thousand animals became affected with neoplasms in a few months. The disease followed the course of the water, beginning above the current of the stream and progressively spreading downwards. It attacked fishes of all ages, whether living free or in captivity. The disease seemed to be connected with a peculiar condition of the water. Young puppies, yet sucking their mother and receiving besides only water from the contaminated places, became affected with goitres. The people living along the shores of those waters were similarly affected. The histological study of the goitres from those fishes, puppies and the people showed that the tumors had the characters of malignant neoplasms.

These facts have certainly a great importance on the general and scientific point of view of comparative pathogeny of tumors and must prove of interest to the sanitary veterinary inspector of fish markets.

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DURATION OF RABID VIRULENCY.—Dr. P. Remlinger already so well known by the numerous investigations he has made and recorded on rabies, has recently called the attention

of veterinarians to the persistency of the virulency of the brain of rabid subjects when placed in similar condition, by the relation of his late experiments.

Rabbits' brains that had died by the inoculation of fixed virus, were placed in and covered with either inert or antiseptic powders and kept exposed to the temperature of a room. After several days, varying in number, these brains were taken off the powders. On the level of the floor of the fourth ventricle of the brain some of the nervous substance was taken, triturated, mixed in emulsion with sterilized water and used to inoculate rabbits by trephining. As means of comparison, the same operation was carried out with other brains kept in the cooling rooms with temperature varying between $+5^{\circ}$ and $+10^{\circ}$.

From these experiments made on 206 animals, it is proved that the brain of a rabbit dead with fixed virus keeps its virulency nine days in saccharine powder, fourteen in bicarbonate of soda, thirty-four in camphor, forty in talc, forty-two in boric acid, fifty in powdered sugar, sixty in common salts, seventy-two and perhaps longer if left by itself at a temperature varying between $+5^{\circ}$ and $+10^{\circ}$.

These figures show that there is not necessary connection between the general antiseptic properties of a product and its special destroying power towards rabid virus. However it is not easy to tell the exact part which belongs to the facility of penetration to the sensibility of the chemical product with the nervous substance, or to its elective antiseptic powers towards the virus.

In the various powders which have served for the experiments, adds Dr. Remlinger, the rabid virus disappears suddenly. A brain may or may not kill. When it does, it is only exceptional to observe a prolongation, always very short, if any of the period of incubation or of the stage of acme. The rabies observed in the trephined animals has always been the classical paralytic form of the disease. Slow consumptive or cachectic rabies has never been observed, even with the most attenuated virus. It may, however, be noticed, without giving to it much

importance, that trephined animals inoculated with brain covered with bicarbonate of soda and used only at the limit of the preservation of the virulency, say thirteen or fourteen days, have presented symptoms of excitement analogous to those of furious madness.

This information has a great value for the question of the transporting or sending of rabid brains from one place to another. If one has not at his disposal neutral glycerine, let him simply place the suspicious brain into common salt, where the virus will keep its perfect and unaltered virulency for more than two months. Or if salt cannot be had, use powdered sugar.

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SUNDRIES ON TUBERCULOSIS.—From the report of the chief veterinarian, Mr. Martel, to which I refer further on, I extract a few facts which can be of interest to sanitary inspectors first, and again to pathologists as well.

The first of these relates to the frequency of tuberculosis according to organs and regions. Unfortunately this covers only the observations taken in two slaughter houses. In them there were found in 1909, 837 cases of generalized tuberculosis, 3,692 of localized in the thoracic cavity, 45 in the abdominal, 1,388 in both cavities. In 1,742 cases only one organ was diseased and in 1,955 several.

The organs that were found the seat of lesions were as follows: 4,315 tuberculosis of the lungs, 79 of the heart, 44 of the pericardium, 771 of the mediastinum, 1,488 of the costal pleura, 682 of the prepectoral lymphatic glands, 3,658 of the bronchials, 2,082 of the mediastinal glands, 410 of the sus-sternals, and 30 of the intercostals.

The liver was diseased in 1852 cases, the spleen in 365, the peritoneum in 645, the digestive organs in 368, the kidneys in 38, the intestines in 298, the mesenteric glands in 1,163 the hepatic glands in 1,506 and the renals in 58. The udder was affected in 70 cases and the lymphatic glands of the mammæ in

851. The tongue had lesions in 47 cases, the sub-glossal glands in 290, the retro-pharyngeals in 1883, the prescapulars in 103, the axillaries in 12, the precrurals in 37, the popliteals in 12, the ischiatics in 29, the iliacs in 248 and the sub-lumbar in 163.

These statistics will no doubt prove of value and interest to sanitary inspectors as some of them have already provided us with similar statements.

The second extract from the report mentioned refers to the duration of the virulency of tuberculous bacillus in milk. It relates to three inoculations that were made on guinea pigs with the milk from a cow that had tuberculous mammitis. One guinea pig was inoculated the 19th of February under the skin of the thigh with milk that had been drawn the 11th of January, say 39 days before. On the 25th of February, the precrural lymphatic gland was hypertrophied and fluctuating. On March 1st there was an ulceration at the point of inoculation, the lymphatics of the opposite side is also hypertrophied. The animal died April 16th, fifty-six days after the inoculation. He was much emaciated. Post mortem revealed tuberculosis of the thoracic and abdominal organs.

A second animal is inoculated in the same condition with milk drawn and kept for 118 days. On August 20th the glands closed to inoculation are indurated and hypertrophied. On September 25th the ulceration occurs and the pig died on December 10th. Post mortem: Excessive loss of flesh, spleen and liver full with tuberculous deposits, also the kidneys, super-renal glands and lungs. The lymphatic glands of both splanchnic cavities are hypertrophied. Few bacilli were found with the microscope. A third guinea pig was submitted to a similar experiment with milk drawn and kept for 184 days. When killed the animal showed no lesions whatever and all the organs were healthy.

Conclusions.—After 39 days the bacilli of milk possess all their virulency and kill a guinea pig in the ordinary length of time; after 118 days, although attenuated, the virulency is yet sufficient to kill an animal in 129 days after the inoculation; but

after 184 days, the virulency is so weak, perhaps it is all gone, that it cannot give rise to any lesion by subcutaneous inoculation.

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A TRIP THROUGH EUROPEAN SCHOOLS.—In Prussia, by a Royal Order of September 5th, the question of the *Doctorate* for veterinarians has received a definite solution. The Prussian veterinary schools of Berlin and Hanover will now confer the degree of Doctor Medicinæ Veterinaræ. In abbreviation, the title will correspond to the D. V. M. of some of our American schools. This is a step which will be approved by many and which deserve a congratulation to our confrères from Germany. The degree may be granted under certain conditions and after examination to German graduates or to foreigners who shall have passed the professional veterinary examinations and also as honorary and as exceptional distinction to those who may have rendered great services to the advancement of veterinary science.

In Wurtemberg.—Founded in 1821 through the exertions of veterinarian Walz, the school of Stuttgart has had a brilliant history, having counted amongst the celebrities of its faculty Hering, Baumeister, Leyh, Frohner and Sussdorf who is at present the director. It had been a question for some years to rebuild the former school. But the government of Wurtemberg decided to close the institution to take place at the latter end of 1915.

In Italy.—The subject of the reorganization of the veterinary schools was brought forward before the Superior Council of Public Instruction. The reorganization has three important objects in view: increase the national patrimony, co-operate to the protection and improvement of public health and give a greater and more national extension to national economy.

In Denmark.—At Copenhagen a monument has been erected by Danish veterinarians in honor of Peter Christian Abildgaard, founder of the Copenhagen College. Prof. Bang reviewed the life of this great veterinarian who had studied his profession in Alfort at the time of Bourgelat.

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BIBLIOGRAPHIC ITEMS.—This month I have to glance at Sanitary Reports that I have received. One from the Continent of Europe and the other from across the Atlantic. The first is the report of Mr. Martel, the Chief Veterinarian of the Sanitary Service of Paris and the Department of the Seine. It is a large book of over 300 pages, where the work of the veterinary staff is minutely laid out and illustrated by numerous plates of statistics, which are to the initiated of real interest. I may, amongst the contents of this elaborate report, take in consideration two points. First is the subject of rabies, which is relatively frequent in France, where the number of lost or erring dogs remains considerable. Indeed, says Mr. Martel, France has a greater quantity of dogs far superior to any acknowledged by other states. In France there are said to be 70 dogs for every 1,000 inhabitants, while there are but 38 in England, 31 in Germany, and 11 in Sweden. And yet rabies in France seems to be on the decline taking into consideration the number of cases recorded since 1900, when there was recorded 2,771 cases, while in 1909 there were but 1,463. The second subject of this report where the interest is great is that of tuberculosis. It is a subject which is of actual interest and will remain as such for years to come. In relation with it, the report contains records of numerous experiments which have been carried out by Mr. Martel's staff, viz., inquiries and experiments on the intra-dermo reaction, on the second ophthalmo-reaction combined with the thermo-reaction on the single ophthalmo-reaction combined with the subcutaneous injection of tuberculine, on the diagnostic value of the second oculo-reaction. All of which show the importance that is attached to those various modes of using tuberculine for testing cattle. The résumé and conclusions found from these experiments are as follows: Second oculo-reaction is the rule in animals that ought to react to tuberculine. It brings out the general reaction, so to speak, reinforce it and draws the attention upon animals in which the thermic reaction is slow to develop. It constitutes a local reaction (which is wanted in general tuberculation) and is to tuberculous animals that, which with the

swelling at the point of inoculation, is in glandered horses, in the test with malleine. Obtained in good condition, ocular reaction gives by itself a very suspicion of tuberculosis. It is a means of control in cases of fraud. It is a good method of diagnosis which deserves to be used in practice. The balance of the report treats of hippophagy in its various points of view, the inspection of abattoirs, inspection of meat, of milk, etc., etc., all of which are of value to sanitarians.

The second report that I have to consider is that of the Chief of the Cattle Bureau, Dr. A. Peters, to the State Board of Agriculture of Massachusetts. Of much less importance than the preceding, the sixteenth semi-annual report brings out important facts. First, after a few general remarks, among which is advanced the good news that "there seems to be no further danger of any more outbreak of foot and mouth disease from stated source" (deficient manufacture of vaccine), the report enters into the consideration of contagious diseases. For rabies a table shows that for the year ending Nov. 30, 1909, there were 461 dogs, 16 cattle, 1 horse, 5 swine and 1 goat that were killed, had died, had been or were yet suspicious of rabies. For glanders there was a marked reduction in the number of cases of glanders or farcy. Tuberculosis is the subject of several statistics and is followed by conclusions relating to miscellaneous diseases, to meat inspection, to licensing slaughter houses and finally with the financial statement the report is closed.

THE GID PARASITE AND ALLIED SPECIES OF THE CESTODE GENUS MULTIPLEX is the title of a publication by the Bureau of Animal Industry in Bulletin 125.

The first part just issued gives the historical review and is due to Mr. Maurice C. Hall of the Zoological Division of the Bureau. "Succeeding parts will follow concerning the morphology and life history of the parasite in question, as well as the symptomatology, treatment, prophylaxy of that disease." It is certain that the complete series of the work that Mr. Hall has been carrying out will prove of great interest to breeders, to veterinarians and to helminthologists. The careful and complete

historical sketch of *Multiplex Multiplex*, the name that Mr. Hall proposes for the *Coenurus Cerebralis*, the concise one of *Multiplex Serialis*, of *Multiplex Lemuris*, of *Multiplex Polytuberculosis*, *Multiplex Spalacis*, of *Cysticercus Botryoides* and of *Acephalocystis Ovis Tragelaphi* shows the great amount of research the author has made and the difficulties that he has had to overcome. The subsequent parts of Bulletin 125 will certainly be looked for by anxious readers.

A. L.

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THE IMPORTANCE OF UNIFORMITY IN VETERINARY DEGREES AND MATRICULATION REQUIREMENTS.—The above two subjects are undoubtedly among the most important, from a veterinary view-point, to-day, and have been matters to which President Glover, of the A. V. M. A., has given serious consideration for some time; long before the American veterinary profession honored him with the highest mark of recognition that it can confer upon a veterinarian. At Chicago in 1909 in his paper presented to the Association of College Faculties and Examining Boards on "Matriculation Requirements for Veterinary Colleges," after presenting the subject in a most lucid manner, the doctor made an appeal to the American Veterinary Medical Association for support, stating that "the time had arrived when the American Veterinary Medical Association should make a determined stand, not only for a higher matriculation standard, but for uniformity as well"; and his auditors at San Francisco were convinced that he had not changed his views. His San Francisco paper appears on page 634 of this issue of the REVIEW, and also a communication to the members of the A. V. M. A. on page 685. We sincerely hope and trust that after the profession have read these two communications, and realized the importance of the subjects presented in them, they will immediately begin to formulate plans whereby they may assist President Glover in their accomplishment.

ORIGINAL ARTICLES.

THE SOURING OF MILK.*

By G. R. FETHEROLF, V.S., CITY MEAT AND MILK INSPECTOR, READING, PA.

The most common change in milk is its souring and curdling, with the production of lactic acid as its chief product. This change does not occur spontaneously, nor is it a necessary and invariable change. Milk, under some special precautions, may be drawn from the udder and kept in sealed vessels for weeks and months without any apparent change whatever. To obtain this result is a most tedious undertaking, so much so that milk produced under almost the most sanitary methods invariably becomes sour. Indeed, so regularly does this change manifest itself, that at any time it does not materialize in milk that is kept at 98 to a 100 degrees Fahr. in sixteen to eighteen hours, the fact at once arouses suspicion that some means were employed to keep the milk sweet by the use of preservatives, or by pasteurization.

Lactic acid responsible for the souring of milk was first discovered in milk by Scheele in 1780. Nothing was known as to the formation of lactic acid even as late as 1847, when Blondeau discovered micro-organisms in sour milk, but gave no relation existing between the germs, lactose and the acid.

Pasteur in 1857 in one of his noted investigations, came to the conclusion that the souring of milk is some kind of a fermentation caused by the action of a peculiar micro-organism which is called "levure lactique" (lactic yeast).

* Presented at the June, 1910, meeting of the Schuylkill Valley Vet. Ass'n, Reading, Pa.

Since then our knowledge of lactic fermentation has been considerably extended by the students of Pasteur and other noted bacteriologists and chemists.

It is now universally known for the last decade at least that the lactic acid fermentation in milk is a chemical change of lactose into lactic acid, caused by a variety of micro-organisms known in common as the lactic acid bacteria.

Milk contains lactose (milk sugar) averaging 4 per cent. The chemical change of lactose to lactic acid, expressed by the formula $C_6H_{12}O_6 = 2C_3H_6O_3$ is very complex.

This change is not yet fully understood, and it is sufficient for us to know that milk sugar is changed into lactic acid due to an enzyme secreted by the lactic acid bacteria, and is therefore purely an enzymic function.

A number of scientists have fully substantiated the fact experimentally; in particular, Herzog extracted an enzyme from the bacterium *acidi lactici*, which, in the absence of the organism, was able to transform lactose into lactic acid.

The degree of acidity of milk can be determined by titrating a certain quantity of milk with a known standard solution of sodium hydroxide (NaOH) using phenolphthalein as an indicator.

Two kinds of acidity may be distinguished in milk and its products, (1) apparent acidity and (2) acidity due to lactic acid. The former is due to the presence in normal milk of casein and acid phosphates, which have the power, like free acids, of neutralizing alkalis. The amount of it is on the average from .07 to .08 per cent. varying with conditions, increasing for instance with the advance of lactation. The latter due to lactic acid is formed in milk after it is drawn, and is caused by the action of certain forms of bacteria on lactose (milk sugar). Hence, when milk contains 10 per cent. of acid, it already contains some lactic acid.

The total amount of lactic acid may be determined by the difference between the total amount of acid and the apparent

acid. In speaking of the acidity of milk, we refer to the total amount and not alone to lactic acid.

As soon as a slight amount of acid is formed, it combines with the calcium of the calcium casein, forming calcium free casein. After the formation of a greater quantity of acid, the acid combines with the casein, forming casein lactate. This substance being insoluble in water is precipitated and is commonly known as the curd. This latter change takes place when the acidity is from .7 to .9 per cent. Any other acid poured into milk will cause the same result. Milk soured by the action of bacteria can only reach an acidity of 1.5 per cent. to 2 per cent. Larger amounts of acid check the life and growth of the organisms. If it is desired to change all of the lactose into lactic acid, the acid must be neutralized as fast as it forms, with chalk or carbonate of zinc.

KINDS OF LACTIC ACID.—It is a well known fact that four isomers of lactic acid exist, although only three need to concern us here. An aqueous solution of one of those rotates the plane of polarization to the right and is called dextro or right-handed lactic acid, and is designated as the d-lactic acid or simply d-acid. The second, lævo or left-handed lactic acid, and is designated as l-lactic acid or simply l-acid. The third, inactive or racemoid lactic acid and is designated r-acid. These various kinds of lactic acid are the result of the action of various forms of the lactic acid bacteria as will be more definitely brought out later on.

EXTERNAL CONDITIONS AFFECTING LACTIC FERMENTATION IN MILK.—Time and temperature are the two chief external conditions necessary for the development of fermentation and the exact time of souring varies in relation to temperature and various cultures. Subject to slight variations, at 10° C. milk becomes sour in 120 hours and curdles on or about the seventh day. At 15° C., it is sour in 66 hours and curdles on or about the seventh day. At 37° C. (blood heat) milk is sour in 16-18 hours and curdles on the second day.

THE LACTIC ACID BACTERIA.—After Pasteur, some of the most noted scientists that isolated lactic acid bacteria were Lister,

Hueppe and Esten. In addition to those, other bacteriologists too numerous to mention separated from milk many various lactic acid bacteria and also gave them distinct names. It is true that these various lactic acid bacteria differ more or less in some minor respects, inasmuch as for instance the time required to curdle milk. Some are capable of accomplishing this chemical change at a certain temperature in a few hours. With others, at the same temperature, it requires several days. Whereas, there are still others which under the same conditions cannot curdle the milk at all.

Whether such bacteria should be separated into different types or species, or whether they represent varieties of the same organism, is a question that caused considerable dispute.

Conn says: "The power of curdling may be increased in the same organism by proper treatment in the laboratory."

Beyerinck makes the statement that the lactic acid bacteria which he studied, could be transformed into one another by cultivation. Many other authorities came to similar conclusions, and, as a consequence, the general opinion of to-day is that bacteria which curdles milk, even if the time required varies extensively, and others which sour it without curdling, cannot be classed as separate types or species, but only as varieties or modifications of the same organism. In reference to other slight differences, it is not yet known to what extent such variations may take place in the same organism. Therefore, it cannot be stated what constitutes a type or specie, and hence it cannot be definitely stated how many types of the lactic acid bacteria there are. Regardless of this fact, however, it has become evident in the last few years that the lactic acid bacteria separate themselves into several more or less distinct types.

Heineman states "that in the ordinary souring of milk, lactic acid is produced chiefly by the streptococcus lactarius and bact. lactis aerogenes and that the former organism predominates in approximate proportion to the purity of the milk." Conn is of the same opinion and also states "that as many as 95 per cent. to 100 per cent. of all organisms in sour milk are of the

bact. lactis acidi or streptococcus lactarius. The more data obtained concerning the lactic acid bacteria, the more evident it becomes that these two named varieties represent very distinct types, and that each of which have many varieties differing in minor respects. Therefore, to understand more fully the lactic acid bacteria, it becomes necessary to study most carefully the characteristics of these several types.

THE BACT. LACTIS ACIDI (*Streptococcus Lactarius*): ITS SOURCE.—This organism is mostly derived from the dust in the air, from the feed of the cattle, the hair and in some exceptional cases from the feces. It develops very rapidly in milk, and when once in the milk pail or can, it has a strong tendency to remain; at any rate, if the utensils are only ordinarily cleaned, as generally is the custom, unless by sterilization in a steam chamber. Hence the most common cause is the milk pail and other milk utensils. It is undoubtedly premature to state much in reference to its original source. Borthel has found the organism on the leaves of certain trees. Whether this source can be regarded as its natural abode is a question. But wherever it does come from originally, it has been fully substantiated, that it is not so vigorous as it subsequently will be when in milk for some hours, proving that the original source is not so well adapted for its welfare in general.

It is not only common in milk in all sections of the United States, but equally as well in Europe and many other sections.

ITS FORM AND HENCE ITS NAME.—There is quite a difference of opinion as to whether it should be called a Bacterium or a Streptococcus. It generally appears in the form of a short non-motile rod, but at other times in spherical pairs, giving the form known as the diplococcus. The longer forms may simply represent the cocci elongating and about ready to divide. Should this be the case, the organism in question should not be called a bacterium, a term applied to those that appear in the form of a rod, but a streptococcus, a term applied to the spherical forms, having one division plane, a most suitable nomenclature then would be "*Streptococcus lactarius*."

Should it be in the form of a short rod, bacterium would be correct, and the term *bact. lactis acidii* should be used. This organism in question was handed on numerous occasions to various bacteriologists. Some called it a bacterium, others a streptococcus. Although it went by the name of *bact. lactis acidii* for at least a decade, in the past few years many scientists prefer it to be called *streptococcus lactarius*.

THE ISOLATION OF THE BACT. LACTIS ACIDII FROM MILK.—It is comparatively easy to separate this organism from milk. For this purpose, use sour milk that has not yet curdled. Milk at this stage contains millions of acid bacteria, and for this reason should be very highly diluted, otherwise they would appear too close together on the culture plates after becoming developed into colonies. Litmus Gelatin should be used as the culture medium. Incubate the plates at a temperature of 70° Fahr. only, for two to four days. At higher temperatures the gelatin would melt, causing the colonies to become indistinct. After they are developed, they appear in the form of minute red points, representing colonies of the *Bact. Lactis Acidii*. Undoubtedly, several acid types may be found, although a distinction can well be made by using a low magnifying power of the microscope.

The *bact. lactis acidii* appear quite red, very small, growing wholly underneath the surface of gelatin. The most distinctive feature of this type is rather a dense, red colony, showing a series of slight projections around the edge, burr-like. These projections are not always present, but when they do appear, it is positive proof of representing the type of *bact. lactis acidii*. Bacteria that grow on the surface of the gelatin do not belong to this species. It grows altogether underneath the surface of the culture medium.

PECULIARITIES—ITS GROWTH IN VARIOUS CULTURE MEDIA.—One of its greatest characteristic features is that its growth on the surface of any culture medium is extremely slight. It does not grow at all on a potato, neither does it grow on the surface of gelatin plates. On agar slants its growth is so slight,

that it is almost invisible. On close examination, however, it manifests itself as a clear, transparent film. When inoculated into a gelatin tube, it grows well along the needle line, but it stops growing soon as it reaches the surface. Inoculated into bouillon, its growth is so scant that it is scarcely visible. Inoculated into fermentation, tubes containing bouillon to which was added lactose or dextrose, it always shows a slight growth by causing a cloudiness. This condition will appear in the open arm as well as in the closed arm, showing that the bacterium is a *Facultative Anaerobic*.

ITS GROWTH IN MILK.—If this organism is inoculated into sterilized milk, it grows readily and produces acid. Various cultures produce acid varying in rapidity and at times in degree. At blood-heat, 37.5° C., some are capable of curdling milk in six hours. Others it may require under similar conditions, as long as from a day to three days; and still others are unable to curdle milk at all. In all cases, acid is produced, but when the proper degree is not reached, as occasionally is the case, the casein is left in partial solution and no curdling can take place. While such are the conditions resulting from cultures derived from various sources, similar results can equally as well be had from different cultures from the same source. If the weaker culture is transferred for several days from one milk into another, it eventually will become more powerful in the degree of producing acid. Since these varying conditions can all be rectified by proper cultivation, whether the various cultures come from different or the same sources, it is more than plausible to conclude that these various organisms in question are simply varieties, under different conditions, of the same organism, the *bact. lactis acidii*.

ITS EFFECT ON MILK.—This type of organism is considered by the dairyman his friend, par excellence. The curd produced through the action of this type is peculiar and most easily distinguished in as much as it is solid, strongly acid, without any holes, no gas bubbles and occurs without the separation of any whey. This type of curdling is most highly esteemed by the

dairyman, since it is most conducive for dairy purposes, and is in accordance with the production of the best grades of butter and cheese.

Especially so does the cheese manufacturer consider it as he usually makes test as to this desired result before he considers the use of various milks, as he is fully aware of the fact that milk used for the purpose of making cheese, showing different results, would not only be valueless, but would cause a great financial loss to use in connection with good milk.

THE BACT. LACTIS AEROGENES—ITS SOURCE.—This particular type of the lactic acid bacteria produces both acid and gas. It has also many varieties. Like the *bact. lactis acidii* it is also derived from sources external to the cow, although chiefly from the dust of the air, and in particular from the feces of the cow, dirt, or from any other kind of filth. It may also remain in milk utensils that were not thoroughly sterilized, from one milking to another, and continually cause a whole lot of trouble. In fact, it is considered the dairyman's foe and in order to avoid the contamination of this organism in milk, great care must be exercised in keeping stable and cows clean, adopt up-to-date measures as to milking, in particular use the covered milk pail and sterilize all milk utensils, and keep the milk at a low temperature. The bacterium *lactis aerogenes* differs in many respects from the *bact. lactis acidii*. Microscopically, it appears larger than the latter. It is longer than it is broad, proving itself a bacterium beyond a doubt. If inoculated into gelatin tubes, it grows well along the needle line and spreads over the surface. On gelatin plates it grows well on the surface, and appears as a round, elevated mass from 2 to 3 mm. in diameter. On the surface of agar and the potato, it grows luxuriantly, forming a thick white layer. In bouillon, it also grows exceedingly well, forming a turbidity and sediment. In fermentation tubes containing sugar, it grows in both open and closed arm, producing gas, which collects at the top of the closed arm. The formation of gas is very characteristic of this type.

If inoculated into milk, it acts also on the lactose, not only causing lactic acid, but also gas.

The power of producing acid, and the rapidity of curdling, varies also in various cultures.

There is a striking contrast in the appearance of the curd caused by the action of the *bact. lactis acidii*, from that of the *bact. lactis aerogenes*; a typical curd of the latter is more or less full of holes caused by the generation of gas, so characteristic of this type. The whey also separates from the curd, causing the final result to appear strikingly different from that of the first type. There is also a difference in the acid produced by these two types.

The *bact. lactis acidii* produces right-handed acid, whereas the *bact. lactis aerogenes* left-handed acid. The former rotates the plane of polarized light to the right and the latter rotates it toward the left.

Whereas the *bact. lactis acidii* is considered a friend to the dairyman, the *bact. lactis aerogenes* is his foe; in fact, a bitter enemy. If milk contains vast numbers of the latter, instead of the former, when it is used in the manufacturing of cheese, the gas that it forms resulting from its lactic acid fermentation, not only causes a disagreeable flavor in the product, but at the same time induces the cheese to swell, oftentimes to such an extent that they are practically worthless. In the creamery where butter is made, the organism is not nearly as disastrous, but it is also detrimental inasmuch as it causes a most disagreeable flavor in butter.

From the preceding facts, it readily can be seen to what extent this organism may be instrumental in inducing a great financial loss to the dairyman engaged either in the manufacturing of butter or cheese. There is another type producing acid and gas, the appearance of its growth corresponding in most respects with the *bact. aerogenes*, but differs inasmuch as it has flagella and consequently is motile. It is therefore not a bacterium, but a bacillus. To bacteriologists it is known as the *bacillus coli communis*. It is not so common as the other types,

but it is not infrequently found in milk. It is a constant inhabitant of the intestines and hence its presence indicates fecal contamination. It is not a dangerous organism itself, but may signify danger if such contamination can be traced to excreta of typhoid patients or some other affections in particular to animals being affected with tuberculosis. In addition to these several mentioned types of acid bacteria, there are others; but, in a vast majority of cases, milk is soured either by the *bact. lactis acidii* or the *bact. lactis aerogenes*, depending on air circumstances, perhaps mostly on temperature. If milk is kept at 70° or lower, it will, in most cases, be soured by the former. If at 80° or above it is more likely soured by the latter. Milk soured at low temperatures, commonly contains dextro-lactic acid, and if soured at high temperatures, it contains lævo-lactic acid.

THE GROWTH OF THE LACTIC ACID BACTERIA AS COMPARED WITH OTHER FORMS IN MILK.—Milk as it leaves the udder is at a temperature most favorable for the growth of most species. Although different types differ somewhat as to the temperature at which they grow best, but at any rate a great majority will develop most rapidly at 37.5° C. or say from 90 to 100° Fahr. There are some types, however, that prefer a lower temperature; therefore the temperature at which milk is kept largely accounts for the kinds, as well as the numbers that may be found. At the freezing point, 32° Fahr., bacteria do not grow at all. At 33 to 35 in several days they may grow slightly; but at the same temperature for several weeks, instead of a few days, they develop considerably, although the milk not manifesting the chemical change, souring or curdling, an indication to go by, the milk would be used in this highly contaminated state with perhaps serious results.

A similar statement can be made in reference to bacteria at 40° Fahr., excepting that they grow only faster and attain a large number in much less time. Therefore, milk or cream kept at these temperatures, although remaining sweet for a long time, should absolutely be considered unwholesome in course of a few days.

At 50° Fahr. those bacteria referred to at lower temperatures will develop still more rapidly, but not as fast as at higher temperatures. At this degree the lactic acid bacteria do not grow yet, but a large variety of miscellaneous forms will begin to develop. The vast majority of those are harmless forms or types that produce toxins and ptomaines, causing various diarrhoeal diseases, such as cholera infantum and summer complaint.

At 60° to 70° Fahr. bacteria grows still more rapidly; at this temperature the growth of the useful and harmless *bact. lactis acidii* is favored in particular. At the outset, this type represents only about 1 or 2 per cent., seldom 10 per cent. of the bacteria present in milk. But so extensively do they grow that in twenty-four hours they constitute as much as 50 per cent. In 48 hours they have developed to such an extent and so overshadowed the other bacteria by the amount of acid produced, that they may represent as many as 95 or even 100 per cent. of all the bacteria present in milk. If milk is kept at temperatures varying from 80° to 100° Fahr., altogether different results are obtained. The growth of bacteria is still more accelerated. In some cases at these temperatures, milk may also be soured by the *bact. lactis acidii*, but as a rule other types will gain the upper hand invariably. The acid producing gas, *bact. lactis aerogenes*, not infrequently becomes very abundant in milk at these high temperatures and cause great losses to the butter and especially to the cheese manufacturer. It readily can be comprehended how important it is for the dairyman of to-day and the consumer to know at what temperatures bacteria do not grow and at which they grow best.

By knowing how milk can be contaminated and how it can be prevented, dairywork becomes easy and all kinds of undesirable results can be avoided.

DR. F. A. BRITT, of La Harpe, Ill., says: "I would as much think of performing surgical operations without instruments as to practice veterinary medicine without the REVIEW."

DOURINE.*

By J. P. FOSTER, B.Sc., V.S., M.D.V., HURON, S. DAK.

SYNONYMS.—Mal or maladie du coït, equine syphilis, epizootic paraplegia, chanceroous epizootic, breeding paralysis.

To the foregoing might be added certain local terms which have been applied to this disease, such as "horse clap" and "horse pox" during the early stages, and "hip disease" after the general symptoms have developed:

The term dourine is perhaps the best as well as the simplest name for this affection, and is said to have been derived from an Arabic word signifying dirt or filth.

This disease is transmitted naturally by copulation and, while the monkey, dog, buffalo, rabbit, rat and mouse are susceptible to it, following experimental inoculation, it will be considered in this paper as essentially a disease of the equidæ.

GENERAL HISTORY AND GEOGRAPHICAL DISTRIBUTION.—Dourine has a wide geographical distribution. It was first described in 1796 by Ammon in northern Prussia. It was at one time quite prevalent in Spain and existed to some extent in France and Germany. Mal or maladie du coït is the name given to the disease in France, where it was reported in 1830. It was also found in Switzerland, Syria, Russia, Poland, Siberia, Italy, and Algeria during the first half of the nineteenth century and, according to one writer, exists at the present time in Hungary, Turkey, Spain, Nigeria, Tripoli, Tunis, Persia, India, Java and Chili.

The disease has also existed to a considerable extent in the United States during the past twenty-eight years and within a comparatively recent date in the Canadian Northwest.

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It first appeared in the United States in 1882 at which time there was quite an extensive outbreak in DeWitt County, Illinois. It was introduced into this locality by a Percheron stallion that had been imported from France; and, although it appears to have been completely eradicated in the territory mentioned, it is evident that exposed animals were removed from the district, to disseminate the infection in other parts of the country. After a lapse of ten years, the disease was reported as existing in northwestern Nebraska.

In 1893 the task of eradicating it was taken in hand by the U. S. Bureau of Animal Industry. The first animal perceptibly affected was a Percheron stallion owned in Gordon, Neb. This horse was a son of the celebrated sire, Brilliant, and was sold by M. W. Dunham, Wayne, Ill., as a two-year-old, to parties near Bloomington, Wis. From there he was taken to Nebraska and was first noticed to be ailing about June 1, 1891. It is probable that the disease was introduced into Nebraska by this stallion. Thirty-two affected animals were found in Nebraska and five in South Dakota during the season of 1893. These were purchased and destroyed and, as no new cases were discovered for a number of years, it seemed as if the eradication of the disease had been accomplished.

During December, 1898, it was again reported as being more or less prevalent in the same district in Nebraska and, early in 1899, the Bureau of Animal Industry for the second time became engaged in the work of its control and extermination. During this year twenty diseased animals were destroyed; for 1900 no statistics available; in 1901 twelve diseased animals were destroyed; in 1902 ninety-five diseased animals were destroyed and twenty-nine diseased stallions were castrated; in 1903 511 diseased animals were destroyed and 1,889 stallions were castrated; in 1904 seventy-six diseased animals were destroyed and 1,103 stallions were castrated.

On account of the spread of the disease the Secretary of Agriculture issued an order under date of January 20, 1903, prohibiting transportation or movement of horses in the counties

of Dawes, Box Butte, Sheridan, and Cherry, in the state of Nebraska, and in the Pine Ridge and Rosebud Indian reservations and the counties of Custer and Fall River, in the state of South Dakota.

In spite of the many obstacles met with, incident to the stamping out of an insidious epidemic of this character under range conditions, the work has evidently been thoroughly accomplished and it is now believed that the disease has been completely exterminated in Nebraska and South Dakota.

During the latter part of 1903 dourine was reported as existing in Van Buren County, Iowa. The report was verified by the state authorities and representatives of the Bureau of Animal Industry, and about twenty affected animals were destroyed during 1904. Suspicion points to an imported Percheron stallion as being responsible for this outbreak. This horse was purchased by a company of farmers and was brought from Columbus, Ohio. This outbreak appears to be the last verified report of the existence of the disease in the United States.

Dourine was first discovered in Canada in 1904, at which time Dr. Burnett, Chief Veterinary Officer of the Northwest Mounted Police, reported its existence in a stallion and several mares near Lethbridge, Alberta.

The biennial report of Dr. J. G. Rutherford, Veterinary Director General of the Dominion of Canada, issued in 1909, shows that from the time of its discovery until the spring of 1908, 628 head of diseased animals were destroyed.

To a Canadian veterinarian, Dr. E. A. Watson, Assistant Pathologist in Charge, Lethbridge Quarantine Station, is accorded the honor of being the first investigator on the American continent to discover the specific organism of dourine in a case due to natural infection. The organism was first demonstrated on February 11, 1907, the material being secured from a vesicle on the mucous membrane of the vulva of a mare owned near Lethbridge. The disease was later transmitted to a nine-months'-old filly, by inoculating her with material taken from the mare just mentioned, the parasite being subsequently demon-

strated in preparations taken from a fresh plaque situated at the seat of inoculation. Dr. M. V. Gallivan was associated with Dr. Watson in this work. These findings were later confirmed by Dr. C. H. Higgins, Pathologist, Health of Animals Branch, Department of Agriculture.

ETIOLOGY.—As it is the purpose of this paper to deal principally with the history and clinical aspect of dourine, its protozoology will be referred to but briefly.

The organism causing this disease is a trypanosome first described in 1896 by Rouget and given the name of *Trypanosoma equiperdum* by Dorflein in 1901.

Buffard and Schneider in 1899 found a trypanosome in Algeria, and produced dourine in a horse with virus that had been passed through a dog, and Nocard later confirmed these results. However, for a time considerable doubt existed as to the presence of a specific trypanosome in the dourine of Europe. It was even suggested by some that there might be two diseases simulating each other, one as met with in Africa due to a trypanosome, the other as seen in Europe, the etiology of which was yet to be determined. This doubt was based upon the fact that although diligently sought for by eminent scientists, the parasite could not be found in the European affection.

In 1905 Buffard and Schneider demonstrated that the disease in France was due to the *Tr. equiperdum*. These findings were confirmed by Leclainche and Lavarán.

Prof. Marek, of Hungary, who failed to find the parasite in cases in his country, and was skeptical as to the identity of the disease, finally discovered it in the blood of a Hungarian stallion in 1905. These findings, together with those of Watson and Gallivan in Canada in 1907, remove all doubt as to the identity of the disease as seen in Africa, Europe and North America.

According to some writers, trypanosomes are found in nearly all of the body fluids during the active stage of the disease. The sero-sanguinous fluid taken from plaques when they first appear or from vesicles upon the vulvo-vaginal mucosæ is the material

from which the parasite is usually recovered. Since equine dourine is transmitted naturally, by coitus, it differs therefore from other trypanosomiasis, in that all other forms so far as is known are disseminated by insects, especially biting flies. The virus evidently possesses the power of entering the system through the mucous membrane of the genitals.

Morphologically the *Tr. equiperdum* is indistinguishable from the *Tr. Brucei*, or the *Tr. Evansi*. It floats about in the plasma, but does not invade the red corpuscles.

The stains generally employed in the study of the organism are combinations of easin and methylene blue, such as that of Romanowsky, or its modifications. Farmer, of India, advocates the use of Leishman's stain for fresh specimens, and Giemsa's azur eosin stain when smears are several days old.

SYMPTOMS.—Dourine has been described by some observers as occurring in both acute and chronic forms. The chronic form is the one usually seen. The acute form, said to be more common in the mare than in the stallion, is perhaps due to secondary infection, and death ensues from a sudden attack of paralysis.

Chronic dourine may be divided into three stages. The initial symptoms of the first stage are visible according to some authorities in from eleven to twenty days after coitus, although other writers place the incubative period at from eight days to two months. In the stallion an edematous condition of the extremity of the sheath may be the first symptom noticed, which gradually extends to and involves the scrotum and inguinal region. Erections may be frequent. There may be swelling of the glans penis with congestion of the mucous membrane lining the meatus urinarius, accompanied by more or less urethral discharge. In my own experience I have seen this discharge so profuse as to soil the insides of the hind legs, and in the most typical case that it has ever been my privilege to witness, in a stallion, I discovered several cauliflower-like growths the size of a pea upon the outside of the meatus urinarius and in the urethral fossa. These growths appeared to be similar to the so-called venereal warts, or condylomata of man and are said to be

caused by irritating urethral discharges. Vesicles followed by ulcers often occur upon the surface of the penis and, where these heal, white glistening spots remain, well defined and circular or oval in form. Farmer considers this a leucoplasia rather than a leucoderma. The penis may become pendulent and distorted, and in some cases, either from excessive swelling or par-



Fig. 1. Note Paralysis of Ears, Eyelids, and Under Lip; Plaques on Sides of Body; Emaciation of the Hind Quarters and Position of Right Hind Leg.

alysis, its retraction into the sheath becomes impossible. Frequent micturition accompanied by strangury may be in evidence.

The initial symptoms exhibited in the mare are similar to those affecting the stallion, in so far as the anatomical and physiological differences of the genital organs will permit. Usually the first symptom noticed is swelling of the vulva, the lips of which may be more or less distorted. Urine mixed with mucus may be voided often and in small quantities. The act of micturition may produce considerable irritation as evidenced by stretching, stamping the feet, switching the tail, and eversion of the

clitoris. Higgins believes that the increase of calcium salts in the urine is largely responsible for this irritation. The mucous membrane lining the vulva is congested, and covered by a tenacious, yellowish secretion. Reddish spots, followed by vesicles and ulcers, appear; the clitoris, its prepuce, and the fossa navicularis being the favorite seats of these lesions. These ulcers persist for some time and do not heal as readily as do those in cases of coital exanthema. The clitoris is enlarged and erect and may be partially or wholly devoid of pigment. The vulva has a "gaping" appearance, showing the exposed clitoris (Fig. 2), which Williams considers characteristic of the disease in young and otherwise healthy mares. There may be a sticky, gelatinous discharge from the vulva which, when mixed with urine, soils the tail and thighs, causing irritation of the skin and loss of hair. Ulcers may develop upon the skin of the vulva and along its muco-cutaneous margins, which when healed present the chalk-white spots, similar to those already described as appearing upon the penis of the stallion. The mammary glands may become involved, as evidenced by swelling and even abscess formations. Sexual desire may be increased and the animal is nervous and irritable.

Many of the symptoms enumerated may disappear for a time, and to the casual observer an almost complete recovery seems to have taken place; but after a period of apparent quiescence, the symptoms reappear with renewed activity. One Canadian observer (Warnock) has shown that severe work will develop the symptoms in a latent case where they have not yet appeared, and will cause a recurrence of the same in cases that have apparently made a recovery. He has "made use of this fact in dealing with suspects, by having them broken to harness and worked. If the animal is diseased, marked evidence is apparent in a very short period, death invariably following."

Some writers state that mares suffering from dourine are sterile, and others, while admitting that they may occasionally become pregnant, claim that they invariably abort. Neither conclusion is correct, as mares in the last stages of the disease have

been observed in the United States and Canada with young foals by their sides.

During the second, or "plaque stage," as it is referred to by some writers, general symptoms develop. Those already described become more pronounced. A rapid falling off in condition is apparent, with increasing nervous debility. This change is noticeable in from three or four weeks to as many months, and



Fig. 2. Note "Gaping" Appearance of Vulva; Enlarged and Ulcerated Clitoris; Depigmentation of Vulva and Anus, and Plaques on Insides of Thighs.

may be due to the dissemination of the causative parasite or its toxic products throughout the general system. Experiments conducted by Watson corroborate this assumption. He has demonstrated that copious bleeding at this stage of the disease produces a temporary improvement, and the nervous symptoms (to be described later) are for a time held in abeyance. In his report Watson says, "To the profuse blood letting, pushed to the physiological limit, I attribute the disappearance of the nervous symptoms, by the removal with the blood of a great amount of toxin of the disease."

Urticariform swellings of the skin, the so-called plaques, now make their appearance upon different parts of the body. According to different writers they appear upon the croup, neck, shoulders, chest and abdomen, but I have observed them also upon the sides of the body and between the thighs (Figs. 1 and 2). These elevations are sharply defined and may be circular, ovoid, or irregular in form, with considerable variation in their dimensions. They may be remarkably transitory, appearing in the morning and disappearing before night; although in most instances they persist for some time before they finally disappear. Lingard considers that they are due to angio-neurotic edema, produced by the casual parasite or its developmental form in the papillary layer of the skin and that the toxin elaborated by the parasite causes capillary dilatation, with localized increased production of lymph. Farmer states that plaques "can be made to appear at any time after they have once shown themselves * * * by giving the animal a little more exercise than usual. After twenty-four hours plaques appeared. Long railway journeys and debilitating causes will bring out an eruption of plaques." He further states that he "took great care when purchasing stallions in Spain to give the animal a good deal of galloping, and examining the following day."

Coincident perhaps with the appearance of plaques, there may be observed peculiarities in the animal's gait and attitude while at rest. Slight dragging of one or both hind feet and "knuckling" of the fetlock joints may be apparent. When forced to move faster than a walk, inco-ordination is very evident and the animal may trot along in what has been referred to as "dog fashion," or perhaps stumble and fall to the ground. While standing, the hind feet may be lifted alternately, with considerable flexion of the hock. After the foot has been raised for a moment or so, it is cautiously lowered, weight thrown upon it and the opposite foot raised with a perceptible jerk accompanied by more or less abduction. Paralysis of the lips, ears, and eyelids may be in evidence and emaciation becomes very marked, especially in the posterior half of the body, so that the

haunches, ribs and spine become very prominent. The mucous membrane lining the vulva and vagina which in the earlier stages of the disease exhibited a congested appearance, now assumes a yellowish color, and is thrown into folds. The white spots already described as appearing upon the genitals, may coalesce and extend beyond the limits of the original lesions, and extensive depigmentation may even take place in the absence of any pre-existing lesion, as evidenced by diffused white areas upon the sheath, scrotum, perineal region, anus, mammæ, and around the eyes, lips and nostrils. Infection of the lymphatic system may now manifest itself by the formation of abscesses in the different glands. In each of the two most typical cases that I have ever seen, there was a pronounced nasal discharge accompanied by enlargement of the submaxillary lymphatic glands.

The third stage of the disease in both sexes is marked by increasing depletion and paralysis. When down, the patient has great difficulty in regaining its feet and, if successful, sways from side to side in the effort to maintain an equilibrium. Finally, the animal is unable to rise and bedsores may form upon the most exposed parts of its body. Death due to general paralysis, pneumonia or septicemia, closes the scene.

While the foregoing symptoms have been mentioned in what is supposed to be their proper sequence in a typical case of dourine, it should be borne in mind that the stages as laid down are not arbitrary, and may overlap, or even be reversed. Thus, incoordination and slight paralysis are often the first symptoms observed, to be followed later by those described as usually apparent during the initial stage of the affection. It is also important to realize that the symptoms may differ considerably, depending upon the susceptibility of the individual, the environment and the virulence of the infection.

Past experiences in dealing with outbreaks of dourine in the United States and Canada have clearly demonstrated the fact that while typical cases are occasionally seen, the atypic form of the disease predominates and, to quote Dr. Rutherford, "gen-

erally following a chronic, insidious and semi-latent course, a most serious menace to the horse-breeding industry."

As the usual time allotted for the reading of papers has already been exceeded, it will be impossible to take up the differential diagnosis and post-mortem findings of this disease.

I have endeavored to give a résumé of the established facts, as well as a few of the more recent conclusions that have been arrived at relative to dourine.

The photos I submit with this paper illustrate a case met with while State Veterinarian of South Dakota, and were secured on September 21, 1903, the day upon which the mare was destroyed.

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BOVINE TUBERCULOSIS INVESTIGATIONS AT THE UNIVERSITY OF CALIFORNIA FARM.*

BY C. M. HARING, D.V.M., BERKELEY, CAL.

The preliminary results of certain investigations concerning bovine tuberculosis at the University of California Farm were presented at the Chicago meeting of this association in a paper by Haring, Sawyer, and Morgan.¹ During the past year these experiments have been continued,^{2, 17} the purpose of this paper being to present further observations in connection with this work.

FURTHER RESULTS IN THE TESTING OF VON BEHRING'S BOVO- VACCINE.

In the paper previously mentioned results were given from a two years' test of von Behring's method of immunizing calves to tuberculosis. In that paper our conclusion was that under California conditions von Behring's bovivaccine fails to protect calves until two and a half years of age. Some immunity, however, seemed to be produced.

Tuberculin tests and the slaughter of immunized and control animals from the experimental herd during the past year have given some interesting data. I will briefly outline this experimental work to date.

In the spring of 1907 *forty-five* calves were secured for experimental purposes. *Twenty-two* of these were treated with bovivaccine after the manner of von Behring and *twenty-three* were kept as controls. Twenty-seven of the calves came from a dairy of thirty cows which proved to be non-reacting by two

* Presented at the Forty-seventh Annual Convention of the American Veterinary Medical Association, San Francisco, September, 1910.

Foot Note.—The small numbers refer to references at the end of this article.

tuberculin tests. Eighteen came from a dairy of eighty-four cows, sixteen of which reacted to tuberculin. Of the twenty-seven calves from the non-reacting dairy herd thirteen were treated with bovovaccine, and of the eighteen from the eighty-four cow dairy nine were so treated. Great care was taken to follow the method and technic prescribed by von Behring. Precautions were taken to eliminate the error of vaccinating calves already infected and during the first year the calves were reared with every possible precaution against tuberculous infection. At the end of eight months all the calves were tested with tuberculin and none reacted. A more detailed description of the selection and rearing of the experimental animals was given in my previous papers.^{1, 17}

After having satisfied ourselves that the band was free from tuberculosis, the forty-five animals were subjected to infection by placing in their pasture five reacting cattle that were apparently in an advanced stage of tuberculosis. These were associated with the calves in a twenty-acre pasture and in a corral. Within six months these five cattle had all died of tuberculosis, as proved by autopsy in each case. During the winter of 1909 no tuberculous animals were with the young cattle. They were fed under an open shed during rainy weather. Other than this, they lived out of doors. In March, 1909, ten more reacting dairy cows were placed in the corral and pasture with the young cattle. Three of these cows were proved to have open tuberculosis by infecting guinea pigs from their feces and all were eventually found to be tuberculous by autopsy.

For economic reasons it has been necessary to slaughter all of the experimental animals whether they reacted or not. Twenty-four of the forty-five experimental calves have been found tuberculous. None of the others had tuberculous lesions. *Of the twenty-two vaccinated cattle ten were tuberculous; six of these came originally from the non-reacting dairy herd and four from the reacting dairy. Of the twenty-three non-vaccinated cattle, fourteen were tuberculous; seven came originally from the non-reacting dairy herd, and seven came from the reacting dairy herd.*

TABLE I.
Showing the age at vaccination, and source of each tubercular animal, and the extent of its lesions.

NUMBER OF THE ANIMAL.	ORIGINAL SOURCE OF THE CALF.	AGE AT FIRST VACCINATION.	DATE OF SLAUGHTER.	LOCATION OF TUBERCULAR LESIONS FOUND ON AUTOPSY.
11.....	From a tubercular herd..	10 weeks.....	Aug. 25, 1909..	Liver and portal lymph gland ^e .
12.....	Non-tubercular herd.....	14 weeks.....	Aug. 25, 1909..	Right precaral lymph gland.
26.....	Tubercular herd.....	12 weeks.....	Aug. 25, 1909..	Mesenteric lymph glands.
29.....	Non-tubercular herd.....	20 weeks.....	Aug. 25, 1909..	Mesenteric lymph glands.
48.....	Tubercular herd.....	12 weeks.....	Jan. 29, 1910..	Posterior mediastinal gland.
15.....	Tubercular herd.....	16 weeks.....	Jan. 29, 1910..	Lungs and mediastinal glands.
33.....	Non-tubercular herd.....	6 weeks.....	Jan. 29, 1910..	Lungs, bronchial and mesenteric glands.
34.....	Non-tubercular herd.....	4 weeks.....	Jan. 29, 1910..	Posterior mediastinal gland.
21.....	Non-tubercular herd.....	16 weeks.....	April 25, 1910..	Retro-pharyngeal lymph gland.
22.....	Non-tubercular herd.....	5 weeks.....	April 25, 1910..	Lungs, pharyngeal and mediastinal glands.
17.....	Non-tubercular herd.....	Not vaccinated..	Aug. 25, 1909..	Lungs, pleura, mediastinal glands.
23.....	Tubercular herd.....	Not vaccinated..	Aug. 25, 1909..	Cervical and thoracic lymph gland.
27.....	Tubercular herd.....	Not vaccinated..	Aug. 25, 1909..	Cervical and mediastinal lymph gland.
36.....	Non-tubercular herd.....	Not vaccinated..	Aug. 25, 1909..	Hepatic and mesenteric lymph gland.
38.....	Non-tubercular herd.....	Not vaccinated..	Aug. 25, 1909..	Bronchial, mediastinal and portal gland.
43.....	Non-tubercular herd.....	Not vaccinated..	Aug. 25, 1909..	Mediastinal lymph glands.
41.....	Tubercular herd.....	Not vaccinated..	Aug. 25, 1909..	Lungs, bronchials, and mediastinal and portal glands.
51.....	Non-tubercular herd.....	Not vaccinated..	Aug. 25, 1909..	Generalized tuberculosis.
39.....	Tubercular herd.....	Not vaccinated..	Aug. 25, 1909..	Bronchial, mediastinal and portal glands.
47.....	Tubercular herd.....	Not vaccinated..	Jan. 29, 1910..	Lungs and bronchials, mediastinal and mesenteric glands.
28.....	Tubercular herd.....	Not vaccinated..	Jan. 29, 1910..	Posterior mediastinal gland.
40.....	Non-tubercular herd.....	Not vaccinated..	Jan. 29, 1910..	Mesenteric gland.
31.....	Non-tubercular herd.....	Not vaccinated..	Jan. 29, 1910..	Bronchial glands.
35.....	Tubercular herd.....	Not vaccinated..	April 18, 1910..	Bronchial glands.
				Lungs, liver and associated lymph glands.

*This animal was the one killed as a demonstration at the meeting of the Medical Milk Commissions of California, at the University Farm.

It has been necessary, for economic reasons, to dispose of some of the fattest non-reacting, vaccinated cattle. In these, no tubercular lesions were found by the federal inspectors.

It would seem from these preliminary findings that von Behring's Bovovaccine fails to confer on calves a degree of immunity sufficient to absolutely protect them against infection until $2\frac{1}{2}$ years of age, when associated with tubercular cattle on pasture and in corrals. However, this does not contradict evidence that bovovaccinated calves have for a time, an increased power of resistance to tuberculosis.

Table I. shows the origin, age at vaccination, date of slaughter and lesions, if any, of the slaughtered vaccinated animals and of the non-vaccinated animals. A study of this table will show that of the twelve animals that reacted to tuberculin and were killed previous to September 1, 1909, the proportion of tuberculous vaccinated calves to tuberculous *non*-vaccinated calves was 1:2. Or, in other words, if one dare draw a conclusion from such a limited number of cases, the amount of protection afforded by the vaccine was 50 per cent. The table shows that since September 1, 1909, twelve more of the experimental animals have proven tuberculous on autopsy. Six of these had been vaccinated and six had not; that is, the proportion of tuberculous vaccinated to tuberculous non-vaccinated was exactly 1:1. It is apparent, then, that very little of the immunity conferred by the bovovaccine persisted after two years.

Bischoff and Company have recently written me that if a third injection had been made when the animals were about a year old their immunity would doubtless have been increased sufficiently to protect them from infection. We have reason to believe that this would have been the case. However, the purpose of this experiment was to test bovovaccine under California conditions. We have followed directions, and those directions did not include an injection of a third dose at the end of one year.

I realize that it is unwise to draw sweeping conclusions from the results on twenty-four animals, but the data is of value when considered in connection with similar tests^{3,4}, which have been

made in this and other countries. It justifies the preliminary conclusion given in our previous paper, and, in addition, the conclusion that after the third year very little, if any, of the acquired immunity remains.

FURTHER OBSERVATIONS ON THE SPREAD OF BOVINE TUBERCULOSIS UNDER OUTDOOR CONDITIONS.

No doubt outdoor conditions have a very beneficial effect on cows already tuberculous. We observed such an instance. Nine emaciated reacting dairy cows were taken from a dairy and dried up. In a short time one died of tuberculosis. The others at once improved in flesh although their ration was changed from a balanced one of hay and grain to one of hay only. Four of the nine ceased to react. The fact that they ceased to react was not because the lesions were healed, for we were able to infect guinea pigs from the feces of three of these cows and eventually the nine cows were all found to be tuberculous on autopsy. It may be their failure to react was due to the fact that they had been tested four months previous.

In exposing the bovovaccinated calves and their controls to infection, the association and infection occurred entirely out of doors. This was fully described in the preliminary report of these investigations. The continued spread of the disease in the experimental herd during the past year strengthens our contention that a strictly outdoor environment will not prevent the rapid spread of tuberculosis among young susceptible cattle. Dairy cows that have been in infected dairies and survived repeated exposures to the disease are frequently observed by veterinarians when tuberculin testing. We had two animals of this type in the experimental herd for six months. One of these I know to have been for seven years in a dairy showing over 50 per cent. of reactors. It is probable she had a high natural resistance to tuberculosis. No lesions were found in either of these two cows in autopsy.

Dr. Rutherford⁵, in his discussion of our paper at the Chicago meeting, pointed out *that* the fact *that* in California and in some

other places tuberculosis *does* spread under outdoor conditions, must remind us of the differences that exist in the virulence of different strains of tuberculosis.

Dr. Baker⁶ in his paper in the proceedings of the sixth international Congress, shows that there has been a rapid increase during the past ten years in the proportion of tuberculous animals received at the abattoirs from certain ranges in California and he suggests that an exceedingly virulent type of tuberculosis is being bred here.

In selecting tuberculous cows for our infection experiments, those used the first year were from a beef herd living under strictly range conditions in the tules along the Sacramento river. It is possible we introduced a very virulent form of tuberculosis by taking these range animals.

THE EFFECTS OF INTRADERMAL, CUTI AND OPHTHALMIC TESTS UPON THE REACTION TO A SUBSEQUENT SUBCUTANEOUS INJECTION OF TUBERCULIN.

Enough work has been done in testing cattle by the cuti reaction of von Pierquet^{8, 9, 18} and by the ophthalmic reaction of Calmette^{10, 11} to show that these methods are of limited value in the diagnosis of tuberculosis in cattle. The intradermal method of Moussu and Mantoux¹⁴, however, seems more promising. The observations of Ward and Baker¹⁵ indicate that it rivals the accuracy of the subcutaneous injection. It is possible that the simultaneous use of some or all of these tests along lines of associated reactions advocated by Lignares¹⁶ will greatly increase the accuracy of our present methods of diagnosis.

With the object of determining the combined effects of the intradermal, the cuti, and the ophthalmic tests upon a subsequent test by the subcutaneous method, the following experiment was undertaken.

Eight dairy cows which, upon physical examination appeared to be tuberculous, were purchased and subjected to the Moussu and Mantoux¹⁴ intra-dermal test as performed by Ward and

TABLE II.

AUGUST 18.		AUGUST 22.		AUGUST 25.		TUBERCULOSIS LESIONS AT AUTOPSY, AUG. 31.									
	Moussu's Intra-Dermal Test. ‡ c.c. O. T. tu- berculin (origi- nal) dilution No. 5.	Von Pirquet's Cuti Test. 100% Tubercu- lin O. T. (bovine).	100% Tubercu- lin O. T. (human).	Calmette's Ophthalmic Test. 1% Tubercu- lin purified.	Physical condition.	Cervical Glands.	Bronchial Glands.	Mediastinal Glands.	Lungs.	Pleura.	Portal Glands.	Mesenteric Glands.	Liver.	Spleen.	Other Lesions.
I.	Swelling 2x2 cm. hard and round.	Negative.	Negative.	Negative.	Temperature rise 4.6° F. Maximum temp. 107.4	Emaciated. Dyspnea and cough when exercised.		+	+	+	+	+	+		
II.	Swelling 5x3 cm. hard inflamed.	Negative.	Indurated area 1 cm.	Capillaris injected, exudate.	Rise of temp. 3.2° F. Maximum temp. 105.4	Poor. Abscess under jaw.			+	+	+	+			
III.	2x2 cm. hard.	Negative.	Negative.	Negative.	Rise of temp. 2.5° F. Maximum temp. 104.6	Emaciated. Dyspnea from enlarged re- tropharyn- geal glands.	+	+	+	+	+	+			
IV.	5x3 cm. hard.	Indurated area 1 cm.	Indurated area 1 cm.	Negative.	Rise of temp. 2.6° F. Maximum temp. 106.2	Fair. Cough. Purulent na- sal exudate.	+	+	+	+	+	+			+
V.	1x1 cm. hard.	Negative.	Negative.	Negative.	Rise of temp. 2.4° F. Maximum temp. 103.6	Poor. Coughs when exercised.		+	+	+		+	+		+
VI.	Negative. Only a trace of swelling.	Negative.	Negative.	Negative.	Rise of temp. 1.4° F. Maximum temp. 105.4	Emaciated. Very weak. Coughs.	+	+	+	+		+			
VII.	2x2 cm. hard.	Negative.	Negative	Left eye watering.	Rise of temp. 2.0° F. Maximum temp. 105.4	Poor. Coughs. Labored breathing.	+	+	+	+	+	+	+	+	+
VIII.	rox4 cm. hard black.	Negative.	Negative.	Negative.	Rise of temp. 2.6° F. Maximum temp. 106.8	Fair. Dyspnea and cough when exercised.		+	+	+			+		
XI. Control	Negative.	Negative.	Negative.	Negative.	No rise.	Calf 3 months.		No	les	ion s.					

Baker.¹⁵ A four-months-old calf, presumably non-tuberculous, was likewise injected as a control.

As indicated in Table II., seven of the eight cows reacted. The reaction swellings varied from one to ten centimeters in size and persisted from five to fourteen days. Ninety hours after the intradermal injection, a simultaneous cuti and ophthalmic test was made following the methods of von Detre¹⁸ and Calmette¹⁰, respectively. Only two of the eight cows reacted to the cuti tests and one of these also had a watering of the eye and slight injection of the conjunctival blood vessels which might have been a reaction to the tuberculin dropped in the eye. One of the other cows had a slight watering of the eye. The calf used as a control showed no reaction. Seven days after the intradermal injection previously mentioned, and three days after the von Pierquet and Calmette tests, the cows were given the regulation subcutaneous tuberculin test, using 2 c.c. B.A.I. tuberculin per animal. They all reacted to the test. Six days later, on August 31st, all but one, which was saved for the A. V. M. A. clinic, were killed and found to be extensively tuberculous. (The animal reserved for the A. V. M. A. clinic also proved to have extensive tuberculous lesions.)

The data is given in Table II. It would appear from this table that the intradermal test has comparatively little nullifying effect on a retest by the subcutaneous method after seven days.

The cuti and ophthalmic tests need little comment. The numerous negative results simply add confirmatory evidence to the findings of Mohler and Washburn,¹³ White¹¹ and others.¹² These do not seem to be of much value in testing cattle.

In addition to the persons acknowledged in my previous reports I am indebted to George S. Baker, D.V.S., Veterinary Inspector of the Bureau of Animal Industry, and to F. V. Twining of the Cutter Laboratory, Berkeley, for valuable assistance.

SUMMARY.

(1) Some immunity was produced by the use of von Behring's "Bovovaccine," two doses of 1 and 5 I. E. respectively be-

ing used. This immunity did not remain to any appreciable extent after the third year.

(2) Further observations on the spread of tuberculosis among cattle kept entirely out of doors confirms our previous conclusion that the keeping of cattle under strictly outdoor conditions will not prevent the rapid spread of the disease.

(3) In 100 per cent. of eight cases the combined intra-dermal, cuti and ophthalmic tests did not prevent a reaction seven days later to the subcutaneous injection of 2 c.c. of B. A. I. tuberculin.

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The following verses were composed by a Mr. Strothers and read by Dr. O'Connell at a banquet given to Dr. J. A. McKinnon, veterinarian at the Land Transportation, Manila, P. I., August 10, 1910, in recognition of his able and faithful services and good fellowship, extending over a period of eight years as veterinarian to the Quartermaster's Department:

OUR FRIEND THE VETERINARIAN.

From Butte City in Montana
To the Philippines he came,
In the land of sweet manana
To woo the fickle Dame.
He came not with martial stride,
He made no saber rattle.
He came to pitch his tent beside
And fight; a long-drawn battle.

In horse's pain, he met his foe!
Their groans his battle cry!
His shots were aimed to kill their
woe,
Or soothe when Death was nigh.
Of't did we meet him with the dawn,
His voice with battle ringing;
His look would tell some horse had
gone
Or still to earth was clinging.

Of't did we meet him with the gloam
From some long fight returning,
Then knew that he had driven home
A telling blow of learning.
He answered well the horse's call
For help; in misery's hour,
He never tired of doing all
That lay within his power.

To make their heavy burden light,
To heal a wounded limb,
Or chase away the shades of night,
When sight was growing dim.
How well the suffering horses knew
By touch, the master hand—
Like cool refreshment of the dew,
Upon a barren land.

Adown our thorny path of years,
He came with healing balm,
A strong ship in a storm of tears,
A fair wind in a calm.
He ever played his true and kind
And won as kindness can,
Pleasant good nature, where behind,
Walked Dr. McK., the man.

And now his friends are gathered
here
With hoarded Friendship's gold,
A parting song, a ringing cheer,
A farewell to unfold.
Though at the parting of the ways,
We sing a sad refrain—
We hold the light of other days,
He will come back again.

MODERN OBSTETRICS OF ANIMALS.*

By J. H. BLATTENBURG, LIMA, OHIO.

Obstetrics, that branch of surgery which deals with the management of pregnancy and labor, is not so correctly applied with respect to animals. To follow out in technical speech or term, "Tokology" (a birth) (to bring forth) might be more applicable to this subject.

The term "obstetrics" should not be limited to the act of parturition, one of the most important of all the animal functions, but includes the essential mechanical portion consisting of means devised to overcome the obstacles that may impede the birth of the young animal, and a knowledge of the functions and conditions connected with conception, generation and the parturient state.

Aside from having the benefit of experience, a successful obstetrician in the veterinary field should possess a thorough knowledge of anatomy and physiology of the generative organs as to the regions situated in the different animals; also should possess great tact in regard to manipulation, natural mechanical skill, readiness in device and patience that he may handle his subject in a humane manner; having the quality of persistence, ever retaining that heavenly disposition, for he is often sorely tried. Yea, verily.

The pelvis is a large, symmetrical, bony cavity, assisted by its ligamentous walls containing, sustaining and protecting a portion of the soft and delicate parts of the genito-urinary tract and forming the passage through which nature intends the foetus to travel in its being born to the outside world. At the anterior circumference or abdominal opening of this pelvis or in this

* Presented to the American Veterinary Medical Association, at its Forty-seventh Annual Convention, San Francisco, September, 1910.

cavity is where usually the foetus presents itself for expulsion, either in the natural or pathological position following that period which it has necessarily undergone for its development.

It is here the veterinary obstetrician encounters most of his obstacles to be overcome. It is much less frequent his attentions are called to interrupted pregnancy or the stage when the foetus has not attained sufficient development to live external to the mother.

PRESENTATIONS.—Those parts of the foetus which present themselves at the pelvic inlet which are met by the hand of the obstetrice, who should be sufficiently able to designate and acquaint himself positively by touch alone the extremely variable presentations of the foetus, as in Holy Writ—"Seeing is believing but feeling is the naked truth."

Is it possible that some member of this association is not present due to a reticence on an anticipated case of parturition in some of the lower animals such as is customary with the skilled physician for the higher order of animals who piloted every one of us safely into the world?

In sacred history we learn that women were the only practitioners of this art among the Hebrews and Egyptians (see Genesis xxxv., 17, and xxxviii., 28, and Exodus i., 15-20), and it is equally certain the Greeks and Romans confided this branch of medicine to women. Phanarete, the mother of Socrates, was a midwife. However, physicians of that day were not ignorant of midwifery, for Hippocrates refers to the necessity of turning the child in certain cases. Craniotomy was advocated in certain cases also. Plato explains the functions and mentions the duties undertaken by women employed in midwifery.

The lot of the veterinarian is not cast so frequently among cases of normal presentation, but more so to the dystocia; and how often not until the owner, his servant and neighbor, or the empiric have done considerable damage and caused the loss of valuable time. Cases of maternal dystocia most commonly dealt with are pelvic constriction, displacement, altered relations of the uterus and morbid alterations of the maternal organs.

Of pelvic constriction, usually the results of fracture at some previous time, the reparative process causing a pelvic exostosis. These fractures are not uncommon with animals as the result of falls, crushing blows or other causes. Female animals, large or small, having sustained such injuries or previously had an obscure and protracted spell of lameness in either hind quarter, should not be employed for breeding purposes unless carefully examined by one competent to discover any alteration in the pelvic diameter. Tumors, such as fibroma, melanotic and cancerous, or even abscesses, may prove causes of dystocia, the surgical treatment of which may depend upon circumstances.

Dystocia due to changed relations of the uterus, most frequent of which found is torsion either partial, complete or multiple, this being not frequently known to the human pregnant female, may occur in all animals, particularly the cow, in which it has been most frequently observed. Hernia of the uterus is occasionally found.

Laceration of the abdominal walls occurs by being unable to support the gradually increasing strain thrown upon them by the heavy uterus.

Morbid alterations of the genital organs causing maternal dystocia such as tumors, their situation, mode of attachment and consistency, may make a great difference in the act of parturition.

Rigidity of the cervix uteri is most frequently met with in the cow and the goat and occasionally in the mare. Complete obliteration of the os uteri may occur between fecundation and parturition, and has been observed in the mare, cow and sheep.

Anomalies of the placenta, morbid adhesion between the foetus and uterus, stricture of the uterus by external bands, persistent hymen, vaginal and vulvular atresia or contraction, may also prove a source of maternal dystocia.

FETAL DYSTOCIA.—This is much more numerous and more frequently met with, but not everyone presents a real serious obstacle to be overcome; some of the seemingly severe and difficult ones, by slight manipulative tact, are delivered without much

effort. But, oh! how often that apparently unyielding bunch of foetal distortion has tested the persistent staying qualities of a veterinarian and lost him his religion!

Foetal dystocia, so numerous and varied, require careful consideration on the part of the obstetrist, thus opening a wide field for investigation.

Aside from the distorted foetal conditions to patiently deal with, we have excess of volume of the foetus, anomalies and diseases of foetal membranes, abnormal quantity of the placental fluid, anomalies in the umbilical cord, diseases such as hydrocephalus, ascites, hydrothorax, emphysema, polysarcia, contraction, tumors, death, monstrosities and multiparity.

The greatest obstacles encountered in dystocia of those mentioned, maternal or foetal, a veterinarian encounters, are uterine torsion, requiring various methods such as abdominal taxis, vaginal taxis, rotation of the mother's body, gastro-hysterotomy, etc.; dead, tumified, distorted foetus, most requiring amputations, extra uterine gestation requiring gastro-hysterotomy or Cæsarian section.

Those more frequently met with are the great number of more or less complicated mal-presentations and positions which give rise to varying degrees of foetal dystocia, and to be successfully overcome, change of position must be effected as a rule. By moving the foetus itself, by repulsion, rotation and version; these movements are sometimes easy, at other times most difficult and may even be impossible. The most favorable attitude for attempting these movements in the large animal is in the standing position, hind quarters elevated, in which position these movements may be effected during intervals between pains, and by the hand alone a birth may be possible with little difficulty. Failure to accomplish the desired results with this method or the use of the instrument employed as a repeller, is where the subject is a powerful and irritable animal, with a long genital canal and deep uterus, uterine contractions so energetic that they fatigue and paralyze the arm and hand of the obstetrist. It is a waste of human energy as well as lowering the vitality of the

animal to continue this battling. Quietude, relaxation of all efforts on the part of the animal is only accomplished and overcome by a complete anæsthesia; and pressure upon the abdomen while in a recumbent position is overcome by elevating the hind quarters and body entirely free of the floor by means of rope and pulleys attached to fastenings about both hocks of animal at one end, the ceiling or some conveniently secure place above for the other attachment.

The gravity of the fœtus and relaxation aiding abdominal expansion (for a veterinarian is an expansionist at difficult parturition if at no other time). The obstetrist can now place himself upon some object high enough to execute his maneuvers of repulsion, rotation, etc., as undisturbed as the workingman at his bench. Should the genital tract be hot and dry, pour in a mucilaginous lubricating fluid of flaxseed water or oil. Failing under these most favorable conditions, embryotomy must be resorted to. Elevating small animals is done with much less effort. An additional set of ropes and pulleys fastened in like manner above, to fasten on to fœtus as needed, is of great benefit to multiply force, also from the mechanical means of extraction such as various cords, crochets or hooks, repellers and forceps; there are few appliances to be added. An instrument is made by Hans Hauptner, Berlin, Germany, whereby securing a foot or an extended leg by a chain loop, dividing the skin longitudinally, a blunt circular blade on a shaft is inserted beneath the skin at the incision. By winding up the chain on a transverse shaft the blade is forced along the leg until it reaches the body, the muscles laid bare allowing more free amputation and extraction of limb in large animals. The reduction in volume of the fœtus by embryotomy is attained by no little danger to the parturient animal as well as the operator by the few sharp instruments employed in this part of the work.

It is said of a certain man known for truth and veracity fulfilling the requirements of the laws of Iowa as a veterinarian, also a graduate of a reputable college, that he will take a foetal dystocia of the larger animals, efforts having failed to rectify

all malpresentations (the axis of the foetus coinciding with uterus and pelvic canal) deliver this flexible distorted foal or calf by slow manipulative traction; he considering the pliability of the young body sufficiently yielding to the more firm parts of itself, can be extracted through the firm pelvic canal in this manner. What do you know about that?

Gastro-hysterotomy or Caesarean section, the removing the foetus from the mother by an incision through the abdominal and uterine walls, pretends to great antiquity, but earlier histories are probably of mythical origin. In the Middle Ages it was added to the Roman law with the intention to give force to the decretals of the Church which sought through the Caesarean section upon the dead to rescue the child for the rite of baptism before its life had become extinct. Some strange notion appears to have been attracted to this mode of delivery as among the old world people the person who had been born by means of the operation was esteemed remarkable and fortunate.

Until recent date Caesarean section was justly regarded as one of the most hazardous operations in surgery upon the human subject. With regard to saving the young in the larger size animals of the lower order the operation is not very favorable. There is no doubt that much of the great mortality which follows the operation is due to the circumstances amid which it is undertaken and not frequently resorted to until other means of delivery have failed; very frequently a dead foetus to begin with; occasionally a putrid foetus has already infected the mother.

The dystocia most likely demanding the operation are due usually to pelvic deformity, exostoses, intra-pelvic tumors, extra-uterine foetation, irreducible uterine torsion and, frequently in the smaller animals, too large a foetus.

The obstetrice having come to the conclusion to operate should lose no time in doing so, owing to the vitality of the mother and the life of the young if still existing. With few exceptions the operation should be done under an anæsthesia and never attempted without observing sterilization as near as possible.

The success following gastro-hysterotomy on the larger animals is much less frequent than that following the operation upon the smaller animals owing to the size and bulk of subject of the former, as foetus and mother prevent to a certain extent following out the desired order of cleanliness and technique. In the smaller animals this form of delivery is performed very frequently, especially in the sow, which is known to have been operated upon successfully by individuals claiming no particular knowledge of veterinary science or having ever attended an institution of such, but simply having observed carefully the *modus operandi* and cleanliness of one more scientifically skilled.

Accidents following parturition are rather diverse and not infrequently complicated, such as retention of the foetal envelopes in the uterus and consequences of the same, traumatic lesions, displacement or hernia of the internal genital organs, post-partum hemorrhage, etc.

Retention of the placenta requires being dealt with according to conditions and time having elapsed following parturition. Emmenagogues prove of little avail in assisting nature to expel the mass of foetal envelopes which, having fulfilled their purpose, are often found in a well advanced stage of decomposition. Nothing short of manual traction with the free use of water containing some antiseptic as warm as the hand can bear will accomplish the removal of the placenta.

Post-partum hemorrhage, so frequent and alarming in woman, is rather rare in the lower order of animals, but the mortality of cases occurring is placed very high. In combating the rapid depletion of the system under this condition, no time should be lost in first removing foetal membranes, then passing into the uterine cavity towels or sheets as a tampon) saturated with cold water, also cold water douches containing styptics. Internal styptics should be administered.

Prolapsus of the uterus or of the uterus and vagina, with complications such as rents or injuries from foreign bodies or the gnawing at this bleeding mass by other animals, and occa-

sionally the uterus is wounded or torn by bad management in parturition. In certain cases there may also exist prolapsus of the rectum and displacement or even inversion of the bladder.

In inversion of the uterus, if attended to sufficiently early by those who are competent, the number of recoveries are considerable. There is no other pathological condition under the head of the present subject in which the obstetrician can demonstrate his artful powers with greater tact. Having removed all foetal membranes and cleansing the parts as best he can under the circumstances, and all efforts failing to reduce this voluminous uterine tumor hanging in a heavy mass, the obstetrice battling against the severe straining of the animal, complete anæsthesia should be resorted to, the hind quarters elevated entirely free of the floor by attaching rope and pulleys to fastenings around the hocks; also to ceiling or convenient place above in which position reduction is made easy. A very convenient contrivance in case of inversion is a common large wooden bowl with holes around the edge for the assistants to grasp into; in the center or bottom a large opening or hole for the arm of the operator to pass through. Often this method will greatly expedite the operation.

Reduction of the inverted uterus having been accomplished, the obstetrice devises means for retaining the uterus in its place such as pessaries, sutures, bandages, etc. That which accomplishes the desired results with the least effort is the pessary, which may vary greatly with the resourceful veterinarian. Lesions during or after parturition regarded as traumatic, of a more or less serious character, are found occasionally as ruptures of the diaphragm, perineum, bladder, intestines, sacro-sciatic ligament, abdominal muscles, etc.

Maladies peculiar to the parturient or puerperal period are regarded as pathology of parturition, the most important of which being vaginitis, leucorrhœa, metritis, parturient fever and apoplexy, paraplegia, eclampsia, laminitis, and other minor conditions, all due save a few to infection from septic material.

To become efficient as a veterinary obstetrict in meeting the many obstacles so far presented, that which is most required is thoroughness and perseverance.

To follow out in close detail what would be regarded or covered by the title "Obstetrics in Animals" would severely test the endurance of the auditors to the subject now presented.

DR. H. E. BRECKENBAUMER, Veterinary Inspector, B. A. I., has been transferred from Mobridge, S. D., to Sioux City, Iowa.

THE HUDSON COUNTY VETERINARY PRACTITIONERS CLUB held its annual "social" on Thursday evening, January 26, in Jersey City. This year it took the form of a Beefsteak Dinner, and was very much enjoyed.

A NEW world's running record for two-year-olds was set at Juarez, Mexico, January 17, when Celisse, a two-year-old filly carrying 123 pounds, ran $3\frac{1}{2}$ furlongs in $0.39\frac{3}{5}$. This is three-fifths of a second faster than the best previous time made by A. J. Small and Donan in 1909 and by Royal Prince last year.—*Breeders' Gazette*.

RECEIPTS of horses and mules at the six leading live stock shipping centres of the West show that St. Louis is now far in the lead of all other cities in the number handled annually. In 1910 there were received at St. Louis 130,200 head, as compared with 83,439 at Chicago, 69,447 at Kansas City, 34,000 at Fort Worth, 29,697 at Omaha and 28,688 at St. Joseph. * * *
—*New York Herald*.

THE MICHIGAN STATE VETERINARY MEDICAL ASSOCIATION will hold its twenty-ninth annual meeting in the Veterinary Building, Michigan Agricultural College, East Lansing, February 7 and 8. The program is rich in good things from the best representatives of the profession in the state. Among them will be the tuberculin test and autopsy, under the direction of Prof. R. P. Lyman, Dean of the Veterinary Division, M. A. C. A banquet and smoker will be held at the Hotel Wentworth, on the evening of the seventh. Every veterinarian in the state should be in attendance at this meeting.

UNIFORMITY IN DEGREES AND MATRICULATION REQUIREMENTS FOR VETERINARY COLLEGES.*

BY GEO. H. GLOVER, M.S., D.V.M., FORT COLLINS, COLO.

Regardless of religious prejudices begotten of early training or of firmly grounded convictions in church dogma later in life, or again in the absence of either, every one who "runs and reads" cannot fail to observe the unmistakable evidence of the divine hand directing the evolution of the species.

There is ample evidence that man has lived on this earth more than two million years. In his evolution he appears to have gained momentum. His achievements in the last half century have been unprecedented and are attributed more than anything else to an insatiable desire to know of nature's laws and profit by them.

The education of the race has been a tedious achievement and typifies the education of man as an individual, which begins at birth and ends only when his eyes have closed in death.

We are evolving in our chosen field of activity and we are destined to go on and on. The rapidity of our progress will be determined by the amount of energy and unselfish devotion we are willing to sacrifice to its cause. Veterinary Science has been taking such rapid strides forward of late that we at times seem almost bewildered and tempted to sit back, content in the belief that enough has been done for our generation. But growth is possible, relatively in the same ratio that we mix interest and energy in our struggle onward and upward. We do not always do as well as we know; self-interest blocks the way. Let us grapple with the problems affecting the welfare of our honored profession with vigor and unselfish determination, knowing that they must eventually be decided for the greatest good to the greatest number.

* Presented at the Forty-seventh Annual Convention of the American Veterinary Medical Association, San Francisco, September, 1910.

In the matter of uniformity of degrees granted by our veterinary colleges, it is a sad commentary upon the usefulness of this association if it refuses to take some decisive action in the near future to correct the existing absurdity. While this multiplicity of degrees, all meaning the same thing, and given by colleges of uniform rank is wrong and should be corrected, yet I would not maintain that this matter is as vital to the welfare of veterinary education in America as some others. Where the degree of Veterinary Surgeon (V.S.) is given, the assumption is that this is intended as a doctorate degree, although the title does not indicate it. Besides, it is presumed that the recipient lays some claim at being a physician as well as a surgeon. Another school is granting the degree of Doctor of Veterinary Medicine (D.V.M.), and this is objectionable for the same reason that, while medicine may in its larger sense include surgery, in reality each branch has its specialists and the degree conferred should not emphasize one at the expense of the other.

Still another school is granting the degree of "Doctor of Comparative Medicine" (M.D.C.), and personally I like this arrangement, but obviously where there is such a multiplicity of cognomens, and such an array of titles suffixed to names of those all in one class professionally, the average person glancing at this sign, for instance, from the street, would have no idea whether the person back of the sign was a physician, a Christian Scientist or a corn doctor.

The degree of "Doctor of Veterinary Science" (D.V.S.) would seem to be very satisfactory. The crux of the whole matter is that there seems to be no serious objection to any one of these degrees, but the public are woefully ignorant as to their import because there are so many of them, and honestly believe in many cases that they stand for different vocations or different degrees of educational attainment in veterinary art, or something they scarcely know what. It is confusing to the public, engenders discord in the ranks, casts unfavorable reflections upon the profession, and no doubt has an economic significance. This discrepancy came about in the most natural way—was in the nature

of things unavoidable and no one is to blame. It can be remedied without material loss or serious inconvenience, but this never will be done if left to the colleges themselves. The Department of Agriculture has, I assume, no special interest in the matter so long as the course of study is kept up to their standard.

It is the duty of this association to take the initiative. Personally I will explain that I received the degree of D.V.M. at Ames College and have the honor of being at the head of a veterinary college that confers the degree of D.V.S., yet I assure you that I am not so actuated by selfishness that I cannot perceive the greater good that would be derived by changing, and if a resolution were passed by this association, asking all the colleges to confer a certain degree, I should ask my Board of Control to make the change and purchase the necessary stone for printing diplomas. And this is all there would be to it. Those of us holding a degree extinct under the old regime would not be discredited, dishonored, or interfered with in any way unless we foolishly chose to make it so.

I wish to recommend for your consideration the appointing of a commission by this association, consisting of the deans or heads of all the veterinary colleges of America in good standing (co-operating with the committee of the Department of Agriculture) to consider this proposition and report to this association one year hence.

The question of advanced degree corresponding to the F.R.S.V.S. of Great Britain and Ireland, might appropriately be considered at the same time.

MATRICULATION REQUIREMENTS.—One year ago I presented a paper at the Associated Faculties meeting, in Chicago, and argued that the time had come in our evolution when matriculation requirements for veterinary colleges should be raised to a higher standard, unified, and entrance examinations taken out of the hands of the colleges themselves. It is said of the medical colleges of America that they are "the best and the worst in the world," and this difference is in the main due, as acknowledged, not to the efficiency or lack of it, with which the subjects in the

curriculum are taught, but to the widely divergent conditions under which students are accepted for the course, ranging all the way from seventh grade attainment to the baccalaureate degree.

The veterinary medical colleges have their professional confrères beaten in college entrance requirements on the whole, yet it must be admitted that this is the weakest place in our entire pedagogic regime. Our educational system in some respects smacks too much of commercialism. It is absurd to think of a boy leaving the seventh grade at fifteen and after ten or twenty years engaged in commercial pursuits, again take up college work and expect to master a profession in three years. He is not perforce basically equipped educationally to digest and properly assimilate the heavy educational diet placed before him. Thanks to the Department of Agriculture, for through their efforts largely the course of study has been strengthened, lengthened and regulated, night schools have been tabooed, the faculty requirements made more exacting, and all this in the interest of strengthening and beautifying the educational superstructure, *but leaving the foundation weak*. It is like building a house upon the sands.

This get-wise-quick idea when applied to a learned profession is utterly fallacious, and is inspired by the same commercial spirit which prompts a man to take a few months' apprenticeship in the trades that he may secure some advantage in securing a job and increase his wage. Education for its own sake in such cases does not appeal. We should stand more and more for higher education in Veterinary Science, and refuse to compromise with the restless spirit of the times which would seek to reach Utopia at a single bound, and succeeds only in helping the misguided devotee to a questionable artificer proficiency.

This idea of the "exclusively practical" is sweeping the country like an avalanche, is invading the industrial colleges, universities and common schools, and it is to be commended, but it has no rightful place in our professional schools.

Education is not a specific commodity to be purchased for a monetary consideration or in a prescribed length of time. Rather

it is a relative achievement and if directed along professional lines, can be attained in a high degree only by a thorough *basic training* and a determined and uninterrupted struggle ever after, burning the midnight oil, concentrating every effort for years and years—*this is getting an education.*

The real worth of an education is not attained if it be directed essentially either for the making of *life* or making a *living*. It should be so adjusted as to achieve both. I am inclined to think that we have been lending too much encouragement to the commercial advantages of a course in veterinary science, and in so doing have opened our doors, in many instances, to men wholly unprepared to do themselves or our institutions justice.

PRESENT CONDITIONS NOT SATISFACTORY.—To one not conversant with the conditions under which Class "A" veterinary colleges are rated, it is inconceivable how all of these colleges are giving practically a uniform course of study with a corps of instructors, in education and experience up to a high standard of efficiency, and yet some are matriculating students upon examination who are almost strangers to the grammar school, and others are requiring high school graduation. Why is veterinary education so different that preparedness is not considered equally essential?

For reasons which are self-evident, students in our primary schools, high schools and colleges, are classified and given their work according to scholarship, but in our veterinary colleges, we find students with college credits taking the same work in the freshman year along with those who have had no training beyond the grammar school and the school of experience. It is like trying to drive an ox and a standard-bred roadster in the same team.

WHAT IS THE REMEDY?—I believe this discrepancy in matriculation requirements to be the most vitally important problem in veterinary education to-day. I do not advocate any radical changes, but I do believe the time has come when we should at least make some move toward correcting this glaring inconsistency.

A few years ago, prominent educators awoke to the fact that the lack of educational standards in our school systems made the matter of grading students very unsatisfactory. This became so apparent that different states, and in some instances associations, organized for the purpose of fixing standards for schools and colleges. As an example, "The North Central Association of Colleges and Secondary Schools" is an organization of seventeen states, voluntary and devoted to the cause of bringing about a keener sympathy and a heartier co-operation between the colleges and the secondary schools. Uniform standards are essential in matters educational as well as in everything else. This association, like others organized for the same purpose, has served the object for which it was created, and it has practically fixed the matriculation as well as graduation requirements for the grammar schools, high schools and colleges, in this group of states.

UNIT COURSES.—The unit course system has come to stay and veterinary colleges may wisely adopt this system of unit credits. The unit course adopted by this association means a course covering an academic year that shall include in the aggregate not less than one hundred and twenty, sixty-minute hours of class-room work, two hours of laboratory work being equivalent to one hour of class-room work.

All accredited high schools are required to give fifteen units for graduation and all recognized colleges are obliged to require fifteen units from an accredited high school for its matriculants. Of these fifteen units, three units of English and two units of mathematics are required as constants. The fifteen units required of recognized colleges mean high school graduation, and while not definitely fixed are usually divided as follows:

Mathematics (constant)	2
English (constant)	3
History	2
Science, Chem.	I
Physics	I 2
Elective	6
	<hr/> 15

Electives may be chosen from the following: mathematics, 2; French, 3; German, 3; Spanish, 2; History, 2; English, 2; Science, 2; Drawing, 1; Psychology, $\frac{1}{2}$ or 1; Political Economy, $\frac{1}{2}$ or 1; Shop Work, 1; Agriculture, 1; Domestic Science, 1; and other electives offered are considered.

Were the veterinary colleges to seek recognition by this association on the same basis that other institutions of high learning are received, they could succeed only on condition that they require fifteen unit credits for matriculation.

It is very evident that most of our veterinary colleges, while they are recognized by the United States Department of Agriculture and the American Veterinary Medical Association, would be discredited by the North Central Association of Colleges and Secondary Schools, and solely on the grounds of matriculation requirements.

Gentlemen, veterinary education will never receive the respect and consideration that is its due until we make our conditions such as will warrant placing it on an equal with other higher institutions of learning. Age and practical experience do not count for unit credits in any educational system in the world.

The State of New York has a system of its own, and a uniform examination admits students to any of its colleges. Our highly respected Cornell University does not give entrance examinations. The veterinary colleges of Great Britain and Ireland are not allowed to admit students upon examinations given by those institutions themselves.

I wish to repeat with even more emphasis than I did one year ago: "The time has come when it is fitting and proper and I believe advisable and necessary for the American Veterinary Medical Association to take decisive action for the betterment of these conditions."

My recommendations respecting matriculation standards are that this Association and the United Veterinary Faculties of America take decisive action at this meeting and promulgate some plan looking to the enactment of reform in this phase of veterinary education under discussion. I wish to recommend

that after the year 1910 all veterinary colleges aspiring to recognition by this association shall require for matriculation either fifteen unit credits without an examination or five units with an examination. Further, that all entrance examinations be placed under the supervision of a committee of this association, working in conjunction with the committee from the United States Department of Agriculture. This would make our matriculation conditions very like those of Great Britain and Ireland.

Some such arrangement as this is entirely within the province of this association and the details could be perfected as the plan unfold. Our British confrères are well satisfied with their plan as it insures a high degree of efficiency in the student body and all colleges being on a common footing, there is avoided the tendency to rush to the college where entrance conditions are easy.

Gentlemen, it is now time in our evolution when this most glaring defect in our pedagogic regime should be seriously investigated. This inconsistency is fast becoming an absurdity.

THE FARM CAT.—The cat is a great blessing, a great necessity on the farm, declares the *Dakota Farmer*. She labors, like interest, when others are asleep. She is patient and, when mice and rats are a slim crop, she is happy with a repast of scraps, out of hand.

The ancient Egyptians worshipped puss, or rather tom, as a God, but on the Dakota prairies the place of the feline is not in the temples. Here she saves cereals rather than souls.

The superstitious think that when a black cat comes, it is a token of ill luck. Believe this not at all.

Our old black Tabby is a perfect diamond in carbon, because of her valorous deeds. Brother Rat and Mistress Mouse, in slyness, do both assail her loyal character, but the entire family would contribute to having her history penned in this way: The Humblest, but Truest Defender of the Home.—*Our Dumb Animals*.

THE SURGICAL RESTRAINT OF ANIMALS. *

BY GEORGE R. WHITE, M.D., D.V.S., NASHVILLE, TENN.

When invited by Dr. L. A. Merillat, Chairman of the Surgical Section, to address this meeting on the subject of "Surgical Restraint of Animals," I was at first somewhat constrained to suggest that this paper be eliminated from the program, and to ask to be excused from appearing on this occasion. However, after more mature consideration, the thought occurred to me that the "Surgical Restraint of Animals" is a subject which means as much to the practitioner of veterinary surgery as does anæsthesia to the practitioner of human surgery, and that there was a place—and a very important one at that—on the program for a paper of this character.

The importance of efficient restraint as a prerequisite to good animal surgery cannot be over emphasized. Surgical restraint—especially as applied to the larger of our domestic animals—is a problem which confronts us, and one which we are called upon to actually solve in a practical way, almost every day. Our present methods and appliances for surgical restraint are imperfect, and in many respects decidedly unsatisfactory. Until quite recently the methods themselves were even unsystematized, to say nothing of the haphazard arrangement of the various and sundry appliances used. And even at the present time, the methods of casting pertaining to special positions remain unclassified and in many respects are not illustrated or even described. The literature pertaining to, or attempting to describe the several special positions is meagre, and that literature which is available is indeed widely scattered. This dearth of literature on such an im-

* Presented at the Forty-seventh Annual Convention of the A. V. M. A., San Francisco, September, 1910.

portant subject should not be allowed to exist very much longer. It is a reflection upon the American, and I can as truly and with as much emphasis say the European veterinary profession, to allow such a practical problem to remain unsolved in this age of twentieth century advancement. However, no one has yet either in this country or abroad, been able to see their way clear to attempt to furnish the profession with the necessary information. Let us hope that we will soon be furnished with more reliable literature on this all important subject.

Each species of our domestic animals are endowed with one or more means or weapons of defense. These must be reckoned with and overcome by effectual means of restraint. The animal must be rendered harmless, and at the same time the operative area must be made immovable and secure by the restraint method at hand. Of course the particular method employed depends largely upon the animal itself as well as the degree of restraint necessary. While we constantly find it necessary to employ methods of subjection and restraint in order to properly perform our duty as surgeons, we should always do so in as humane a manner as possible. Humanitarian treatment applies here as well as elsewhere in the practice of veterinary science. We should never take advantage of an animal when confined, in order to torture or inflict unnecessary pain of any kind.

Not only does the problem of surgical restraint concern the surgeon himself, but his client and patient are directly interested to a well-marked degree. The surgeon owes it to his client, his patient and to himself to become proficient in properly and securely restraining animals for examination and operation. Without efficient restraint the surgeon is in constant danger of great bodily harm; the animal is in danger of self-inflicted injuries as a result of its own efforts at resistance, thereby causing the owner financial loss which could and should have been avoided by proper methods of procedure. There is no disputing the fact that the veterinary colleges themselves are largely responsible for the haphazard manner in which restraint methods are used by the great majority of veterinarians of this country. The col-

leges take an apparent delight in turning out men unequipped in this important branch of what should be a part of their college course. If the subject is taught at all, in the majority of the colleges it is done in a half-hearted, unconcerned way which makes little or no impression on the student. This mode of teaching, or I may properly term it criminal neglect, is done in spite of the fact that nine chances out of ten this very student body will be confronted with the problem of surgical restraint before the ink gets dry on their diplomas. The method of restraint used and the manner in which he uses it, will in many instances reflect more upon the surgeon's ability than the dexterity or thoroughness of the operation itself. Many reputations have been made by proper restraint methods, and on the other hand, equally as many reputations have been lost by ignorance of this subject. Each operator should select his favorite method—the one or ones which most appeal to his fancy—and by practice become proficient in the skillful use of the same. The time spent will be well invested, and I assure you that you will soon be repaid tenfold.

In order to cast and secure an animal properly and successfully, the operator should possess a level head associated with plenty of courage and confidence. He should retain his equilibrium in spite of any untoward accident or emergency which may chance to take place. Self confidence and good judgment are both valuable assets in performing work of this character. The surgeon should get control and remain in control from the time the twitch is placed upon the animal preparatory to applying the hobbles or casting harness until the animal is again on its feet. Do not forget or underestimate the various dangers and hazards which may take place. However, do not allow yourself to become over absorbed in these possibilities to the extent of losing your head. This would there and then render you incompetent to proceed. Retain your mental faculties sufficiently to continue with dispatch and skill, thereby doing justice to the patient and honestly earning your fee.

As soon as the surgeon has examined the patient and diagnosed the case—provided the case be one of a surgical nature, the problem of subjection or restraint confronts him. It may vary anywhere from partial restraint to restraint in its most complete and secure form. The restraint method or appliance necessary may vary all the way from the simplest form of twitch to the complex hydraulic operating table. The degree of restraint will depend upon:

- I. The temperament of the patient.
- II. Position desired or required for the particular operation now to be undertaken.
- III. Physical condition and dexterity of the surgeon.
- IV. Facilities for operation at hand, viz.: (a) Number and qualification of the assistants. (b) Available surgical restraint appliances. (c) Character of the casting surroundings. (d) Value, age and size of the animal.

Surgical restraint methods begin with subjection by means of twitches, gags, war bridles and barnacles. These appliances are used to divert the animals' attention while the hobbles or casting harness are being applied. Many different appliances are used for restraint of the horse in the standing posture. These vary all the way from the simple knee strap for restraining one fore foot to the hippo-lasso, and the various forms of stocks for restraining all four feet.

When deciding whether or not it is necessary to cast and secure a horse for operation or other purpose, the surgeon should carefully consider the temperament, the physical condition of the animal, the length of the time restraint will be required, the painfulness and character of the operation and last, but by no means least, the physical ability and qualification of the operator. As a general proposition, it is always advisable to cast and secure an animal for painful or long continued surgical operations. Without exception, nervous, highly bred and vicious animals should be cast and securely confined. When it has been finally decided

to cast the animal, we should, first of all, carefully survey the surroundings and select the most satisfactory location. The ideal operating mat or mattress is a plot of green grass grown upon smooth ground. Select the place—be it stall, hallway or operating room—where the most room is available. Then a proper bed must be prepared. This may be done by the use of tan bark, wood shavings, straw, hay, excelsior, sawdust, etc., or a specially constructed mattress may be used.

The next problem that confronts us is which particular hobble or casting harness it is advisable to use in this particular case? We have the hobble casting harness, and operating table from which to make our selection. Each of these have their advantages as well as their disadvantages. The method employed must depend largely upon the circumstances and surroundings encountered in each individual case. The temperament, size, strength, age and conformation of the animal must each receive due consideration. Then the location of the field of operation, the length of time required to operate, number and skill of the assistants, value of the animal, and means of restraint available, are all to be considered. To avoid rupture or dislocation of important internal abdominal organs, it is best to prepare the patient before casting. This is done by withholding water and food for from twelve to twenty-four hours. When we once undertake the task of casting and confining the animal, it should be completed with dispatch. Do it quickly, avoid accident, unless same is unavoidable. And, above all things else, for the personal safety and protection of the operator and the welfare of the animal, the restraint should be secure. The dangers encountered in performing work of this character are legion. The operator is often kicked, struck or bitten while applying and adjusting the casting apparatus. The animal may receive halter burns, lacerations and abrasions of different kinds. Rupture of muscles and tendons sometimes take place. Fractures of the vertebræ and other bones are by no means infrequent. Some patients present radial paralysis as a sequelæ of casting, while others become exhausted and never rise after being released.

HOBBLER.

Hobbles as a means of restraint have the advantage over any other method in so far as they are light, portable, strong and convenient. They can be quickly applied and the animal cast and secured with few assistants and little ceremony. An animal can also be released promptly and allowed to regain its feet. The disadvantages of hobbles and the impossibility of securely restraining the patient, liability of accident, to patient, and inability to fix the legs in special positions for operations where position plays an important role. There are numerous styles and kinds of hobbles; some are, of course, better and more satisfactory than others. In making a selection, be sure and not make the mistake of sacrificing strength for appearance. Be sure the hobbles you use are well made and strong.

DIRECTIONS FOR CASTING AND CONFINING A HORSE WITH HOBBLER.

First—Select a suitable place and prepare a soft bed for casting.

Second—Place the animal in proper position.

Third—Apply the twitch.

Fourth—Apply the operating hood.

Fifth—Apply the hobbles.

Sixth—Detail assistants to their proper positions and instruct them to obey orders.

Seventh—Cast the animal.

Eighth—Secure the animal.

CASTING HARNESS.

Casting and restraining the horse by use of harness, ropes and other methods, aside from hobbles and operating tables, will surely test the skill and dexterity of the surgeon in the efficiency of his restraint technique. It is by means of the various designs of securing harness and ropes that most of the special positions of the animal are obtained. Special positions are necessary in order to perform certain surgical operations. Restraint by use

of casting harness and ropes means restraint in its broadest sense. With these special appliances we are enabled to render the animals absolutely motionless, and at the same time harmless. When thus properly restrained, the animal is entirely at our mercy and we can with safety and confidence proceed with whatever operation we wish to undertake.

OPERATING TABLES.

As a means of restraint in the recumbent posture, the operating table occupies an unique as well as an important position; however, the operating table as with the stocks, has its advocates as well as its adversaries. Many prominent surgeons of this and other countries are flattering in their praise of the table, while other practitioners of equal prominence and qualifications are caustic in their condemnation of the operating table.

Many have condemned all tables in general without subjecting a single one of them to a fair and impartial trial. Others have condemned all tables because one single table in their hands chanced to be defective in workmanship or design, hence unsatisfactory. Some practitioners have even filed severe indictments against operating tables because they are stationary and not sufficiently light or small to be carried in their instrument grip from call to call. Another objection raised by some is the inconvenience or impossibility of putting some fractious or nervous animals on the table, or because it cannot be used under any and all circumstances and conditions. They even dislike it because it occupies too much space in the operating room, and requires two or more assistants to handle a large and strong horse. However, after considering all phases of the operating table proposition, I have no hesitancy in saying that the table is a valuable adjunct to our surgical restraint equipment, and fills a gap which is distinctly its own. In conclusion, I would like very much to impress the importance of the surgical restraint upon the active practitioners present. Also to insist upon its receiving more and better consideration in our various veterinary educational institutions. It is practical, it is necessary, it is worthy of your attention.

REPORT OF AN OUTBREAK OF HAEMORRHAGIC SEPTICAEMIA IN SHEEP. *

BY S. H. WARD AND W. L. BEEBE, ST. PAUL, MINN.

The term hæmorrhagic septicæmia is applied to several different affections regardless of the causative factor, but as applied by the authors in this paper it means an infectious disease of sheep, either acute or chronic, caused by the *Bact. ovisepticus*.

Lignieres seems to have been the first to demonstrate that this disease was caused by an organism which belongs to the hæmorrhagic septicæmia group which he later terms *Pasteurella*. Although he first discovered the cause of this malady in the Argentine Republic, he was able later to demonstrate its existence in several parts of France. Since that time it has been found in many different parts of Europe.

The outbreak of hæmorrhagic septicæmia that was investigated by the writers occurred in a flock of 2,700 sheep that were shipped from Cle Elum, Washington, to Chicago. They were loaded in Cle Elum on August 3, and unloaded and fed at Missoula, Montana, on August 4. At that time three of them were found dead. They were reloaded the following morning, August 5th, and hauled to Glendive, Montana, arriving August 7th, and again unloaded, fed and watered. At that time 115 were found dead in the cars. They were again loaded the same day and brought through to New Brighton stock yards just outside of Minneapolis, arriving August 9. Ninety-one dead sheep were removed at that time and several more were sick.

On August 10 the Live Stock Sanitary Board was notified and Drs. Ward and Kennedy visited the yards to try and ascertain the cause of death. It was impossible to tell just how many

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were sick at the time of this visit, but fifty-one died between the morning of August 9th and 11 a. m. of August 10th, at which time they were again loaded and shipped to Chicago.

As these animals had been in transit almost continuously, the attendants had had but little opportunity to observe the symptoms. Upon making a casual examination of the flock, which was composed of lambs, the healthy animals appeared to be in prime condition. Several sick ones were observed by reason of their being dull and listless. The ears were dropping and the head pendent. Labored breathing was also noticed. Several of the animals that were down were examined closely. The temperature was found to range from 106 to 108.8. The pulse was accelerated and jerky. The respiration was very much increased. They refused both food and water. The mucous membranes were deeply congested. Some of the animals had a very profuse diarrhoea, the discharge being very thin and of a very dark color, but no blood was observed. Nearly all of the sick animals showed a very marked mucopurulent or glairy nasal discharge. Most of the sick animals remained lying down, but if assisted to their feet walked without difficulty.

Several of the animals were examined post-mortem and the following lesions were found present. Ecchymoses in the subcutaneous tissue. Lungs congested. Ecchymoses on the pericardium and the costal pleura. The thoracic side of the diaphragm also showed many hæmorrhagic areas. All four compartments of the stomach were more or less thickly sprinkled with ecchymoses. In some instances there were hæmorrhagic areas on the intestines, but not as marked as on the stomach. The liver also in one or two cases showed hæmorrhagic areas. In all instances beneath the peritoneum of the spleen there were many hæmorrhages. The kidneys were found to contain petechial hæmorrhages.

Specimens of the spleen and liver were brought to the laboratory in a small bottle. Owing to Dr. Beebe's absence from the city no examination was made until August 13th. Upon that date many small oval bacteria could be found in smears, made

from the tissue. A rabbit was inoculated subcutaneously with $1\frac{1}{2}$ c.c. of bouillon suspension prepared by grinding up a piece of spleen. The rabbit died the following day. *Bact. ovisepticus* was recovered in both agar and bouillon cultures from the heart's blood and liver. Many bipolar oval shaped organisms could be found in tissue smears. The original agar slope culture from the rabbit was kept until September 26th, when a tube of bouillon was inoculated from it and the following day, August 27th, a rabbit was inoculated intravenously with 2 c.c. of a bouillon culture. Rabbit died August 28th. Pure culture of *Bact. ovisepticus* were recovered in bouillon and agar from the heart's blood.

September 30, 1909, at 4.30 p. m. a spring lamb was inoculated subcutaneously in the left groin with 2 c.c. of the bouillon culture taken from the heart's blood of the rabbit. October 1st, at 9 a. m., this animal was very lame in the left hind leg, and remained lying down on its right side, breathing very shallow and died in about half an hour. In the room were several pools of very dark colored feces which had been passed during the night. A post mortem was held at 1 p. m.

POST MORTEM.—Upon removing the skin several areas of ecchymoses were noticed in the subcutaneous tissue. In the vicinity of the point of inoculation on the left groin there was an oedematous bloody area about 30 cm. in diameter and 2 cm. in thickness. The superficial inguinal lymph glands were noticed to be enlarged, hæmorrhagic, and oedematous. The muscles were very pale and more friable than normal. The lungs were slightly congested, particularly the one on the right side. This congestion was in all probability due to hypostasis. The heart contained many ecchymoses varying from 1 to 5 mm. in size, located along the anterior and posterior longitudinal furrow. The thymus was very much congested and contained many ecchymoses.

The costal pleura and the pleura covering the posterior aorta contained many hæmorrhages varying from 1 to 2 cm. in size.

The abdominal side of the diaphragm was also thickly sprinkled with hæmorrhages.

The blood vessels of the stomach and intestines were very much congested. The mucosa of stomach and small intestines were apparently normal. The mucosa of the cæcum and colon was very much congested.

The spleen was enlarged, rather friable and thickly sprinkled with petechia.

The liver was slightly congested and contained two or three hæmorrhagic areas, varying from 2 to 4 c. m. in diameter.

The kidneys were congested and contained several small hæmorrhages.

October 4, 1909, at 4 p. m. a small spring lamb was thoroughly washed in the region of the groin. The sebaceous material was dissolved by thoroughly rubbing the washed area with ether. The area was then rubbed with a rough sterile towel until the blood oozed through the skin. A 24-hour bouillon culture of *Bact. ovisepticus* which had been inoculated from an agar culture recovered from sheep No. 1 was rubbed over the area with a piece of sterile cotton. The inoculated area was protected by placing a piece of sterile gauze over the surface, held in place by strips of adhesive plaster. October 5th, at 4.30 p. m., smears were made from the pus which was present on the inoculated area and many oval bipolar staining organisms were found. October 6th the infected area began to improve and October 11th at 2 p. m. a subcutaneous injection of $\frac{1}{2}$ c.c. of a bouillon culture which had been inoculated from an agar culture recovered from the heart's blood of sheep No. 1 was made in the right flank. This animal's temperature had been taken for six days previous to the subcutaneous inoculation and was found to average 103.8. At 4.30 p. m. of the day of the subcutaneous inoculation the temperature raised to 105. October 12th the animal was very lame in the right hind leg. The temperature was 106.8 in the morning and 106 in the evening.

She ate well in the morning, but at night ate very little. She drank little water all day and was dull and listless and at 6 p. m. was unable to get up, breathing very shallow while the pulse was very rapid. In the morning she was found dead.

POST MORTEM.—Performed at 10 a. m. Upon removing the skin an cedematous swelling about 2 cm. in thickness and 20 cm. in diameter was noticed on the right thigh. This swelling extended nearly around the leg.

The costal pleura was noticed to contain several hæmorrhages about 5 to 10 mm. in diameter. There were a large number of petechial hæmorrhages on the thymus. The heart contained several ecchymoses along the anterior and posterior longitudinal furrows. There were several ecchymoses, varying from 5 to 10 mm. in diameter, along the pleura covering the posterior aorta. The lungs showed a small amount of hypostatic congestion, otherwise they were normal. The stomach and intestines were normal in appearance. The spleen was slightly enlarged and soft.

The liver contained a hæmorrhagic area about 4 cm. in diameter in the left lobe. The cortex of the right kidney was very pale and upon cut section the medulary portion was found to contain many ecchymoses. The left kidney was very much congested, both in the cortex and medullary portion and contained a cyst about 5 cm. in diameter in the posterior portion. Cultures were made on bouillon and agar gelatin from the heart's blood, liver and spleen.

Smears from the heart's blood and liver, stained with methylene blue revealed many bipolar stained organisms. After incubating the cultures at 37° C. for twenty-four hours, *Bact. ovis septicus* was found present.

October 30th a rabbit was inoculated intravenously with 1½ c.c. of a bouillon culture recovered from sheep No. 2. The rabbit died the following day and *Bact. ovis septicus* recovered in pure cultures in agar and bouillon.

November 4, at 4 p. m., a six-day-old heifer calf was inoculated subcutaneously in the left flank with 5 c.c. of a 24-hour bouillon culture that was recovered from the rabbit inoculated October 30th. The temperature of the calf for the two days previous to the inoculations averaged 101.3° F. At 7 a. m. the morning of the 5th the temperature was 102.6° F. At 4 p. m. in the

evening it was found to be 104°. It remained between 104° and 105° F. until death. She ate and drank as usual during this time.

November 6th she refused both food and water, could not get up and appeared very listless. Examination revealed a large oedematous swelling extending from the point of inoculation along the abdomen and to the posterior half of the thorax. This swelling was about 10 cm. in thickness and about 30 cm. in breadth. She died some time during the night of the 7th.

Post-mortem examination was made at 9 a. m. November 8th. When the skin was removed a bloody serous fluid oozed out from the oedematous swelling which extended along beneath the skin of the abdomen and thorax.

The left lung was very much congested. This was probably due to hypostasis, as the animal was lying on that side at the time of death. The right lung was apparently normal. Many ecchymoses were noticed along the anterior and posterior longitudinal furrows of the heart. The capillaries of the costal pleura were noticed to be very much congested. The abdominal organs were found to be apparently normal. Cultures taken in agar gelatin and bouillon from the heart's blood and liver revealed *Bact. ovisepticus* after twenty-four hours' incubation. Smears from the same sources as cultures showed a small number of oval bipolar stained organisms.

This strain of *Bact. ovisepticus* had a tendency to show bipolar staining in tissue smears. This property, however, was not as pronounced as with some of the other organisms of this group. The tendency to form chains in liquid media might easily lead one to mistake it for a streptococcus or diplococcus. In cover glass smears they were from .5 to .8 micron broad and 1 to 1.5 micron in length and the ends rounded. The central portion was usually faintly stained while the ends were a very intense color when stained with either Löffler's methylene blue or carbo fuchsin. They did not retain Gram's stain. In bouillon cultures there was a tendency for them to stain uniformly throughout, although usually several organisms could be found in a field that showed the bipolar staining. The organism was non-motile aéro-

bic, grew best at 37° C., but would grow slowly at room temperature. In plain bouillon and dextrose bouillon a heavy growth was produced with a very thin pellicle which was easily broken upon shaking. Dextrose broth becomes acid in reaction. No indol was produced in Dunham's solution. Milk was not coagulated and no perceptible growth took place on potato. A very scant growth was noticed on the surface and along the line of inoculation in a gelatin slab culture.

It is unfortunate that conditions prevented the collection of more tissue, and that it was impossible not to make a more thorough investigation of this outbreak.

Upon examining the evidence it will be seen that the same symptoms, lesions and short duration of the disease were similar in the naturally infected animals and the experimentally infected ones. The organism isolated from the spleen of the sheep was very virulent for sheep and less so for calves, as was shown by the longer duration of the disease and the marked local oedematous conditions extending from the point of inoculation and the scarcity of the organisms in the blood smears after death. Although it was impossible to make an entirely satisfactory examination on account of scarcity of material it would seem from the above evidence that the *Bact. ovisepticus* isolated was the cause of the disease.

CAB HORSES IN PARIS.—Paris—and the rest of the world—had its laugh when a few women undertook to earn their living by cab driving. But the women have succeeded; they make the living they are after, and incidentally better the lot of the Paris cab horse—never a very happy one—as far as they can. It is said in one of the cab stables that a certain horse, regarded as so vicious that no man driver would use him, has by a woman's kind and gentle treatment been so tamed that it is one of the best animals in the stable.—*Youths' Companion*.

THE APPLICATION OF MEDICINAL AGENTS TO DISEASE.*

By F. F. BROWN, D.V.S., KANSAS CITY, MO.

The use of drugs in relation to disease is as old as the human race itself. With suffering comes an immediate search for relief, and it was but natural, before the true value of drugs was understood, that the sufferer should turn to some agent that would impart an unusual sensation or experience in the hope that the affliction might be abated. Early experience demonstrated that certain drugs would produce certain definite results, and upon this small nucleus of empiricism our present knowledge of medicine is largely built.

Empiricism is not to be criticised too harshly for it has added much to successful therapy. Its practice will likely continue with reference to those diseases that thus far have baffled the skill of the most eminent pathologists. Therapeutics is still an inexact science, for pathology must blaze the way to its rational application. As rapidly as the cause and nature of disease is demonstrated, just that promptly will the field be opened for the intelligent application of remedial agents.

The uncertain footing of therapeutics in the past, due largely to lack of correct pathologic understanding, gave rise to differences of opinion among men, and through scepticism, the opportunity was given for a new school of medicine to come into existence. Furthermore, there has been promoted a numerous class of so-called sciences, that ignore the use and decry the value of medicine, and under the cloak of mysticism practice their art upon

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whosoever applies. The promoters of these latter find in the human family a mental attitude and credulity not expected in the lower animals, and hence veterinary therapeutics has a right to attain a higher degree of exactness than can ever be hoped for in human medicine.

The fact that there has been uncertainty in the application of drugs in the past, should not deter us from readjusting ourselves in the light of present pathologic knowledge, and seek to place drug therapy upon a more commanding plane.

Scores are rushing into the fields of specialization. The surgeon, the pathologist, the bacteriologist and the sanitarian are all attaining eminence, but where is the really great veterinary therapist of to-day? Is the field not sufficiently inviting, or fascinating, or is the relief and cure of afflicted lower animals not a noble calling? Perhaps the task is too great; for he who would select with wisdom the proper drug that shall meet a given disorder, has a mighty task at hand. Such a man must be well versed in anatomy, histology, physiology, chemistry, and all that goes with pathology and diagnosis. He must be conversant with all the properties of the thousands of available agents, and must know from the nature of the disease just what effect is needed, and select and administer in dosage sufficient to produce that effect, and be able to recognize the action when produced. Such a person may be likened to the young man who once desired to qualify himself for the legal profession, and upon seeking the advice of an eminent jurist asked, "What must a man know in order to practice law successfully"? The man of learning replied "Everything." The man that hopes to master and understand just how a little particle of matter we call medicine influences tissues and organs when diseased, must be content to spend a lifetime in keen observation and clinical study.

Much as we desire to know, there are perplexing problems yet unsolved. Even the chemist has not made it clear why some agents are toxic and some harmless, why one agent has an affinity for one tissue and another another, why some drug will

exalt the function of a gland as it passes through it in the process of elimination, and another not disturb it in the least.

The reaction that certain tissues give to certain drugs is something marvelous, and is frequently of such intensity as to cause prompt cessation of life.

In a general way, the majority of medicinal agents must reach the blood stream before they can exert any marked systemic or local effect. In order to reach the blood they must first be in solution, or if administered by the mouth, must be capable of undergoing solution in either water, acid or alkaline media.

If drugs are to be absorbed by way of the alimentary tract, the condition of that canal should be determined in advance, for if its function is suspended through derangement, the results will be highly disappointing. Only so much of a drug can exert its action in such a case as is circulating in the blood, and frequently the process of elimination keeps pace with tardy absorption, giving no opportunity for physiological effect.

It is beyond our understanding to foresee the chemical change that may occur in drugs during their passage through the body. Even before absorption takes place they are subjected to the action of both acids and alkalies which results frequently in altered forms.

In passing through that gland of complex functional activity—the liver, there are undoubtedly chemical alterations, and even positive destruction, but experimental research has never been able to tell to just what extent. The liver is apparently the chief factor in modifying absorbed toxic agents, so that when a substance is released again in the blood stream, it is no longer capable of exerting a pernicious effect upon the economy. The remarkable tolerance to poisonous agents that can be developed in a body, by giving graduating doses, is probably due to the energies of the liver in this direction.

Again, when an agent reaches the circulating fluid there is still opportunity for chemical change. Should the drug at this time be of a nature such as is required for reconstructive pur-

poses, so much as is needed will be appropriated, and the excess or remainder will be carried by the current to special points for elimination.

Many agents have for their only mission the bringing of constructive material to the tissues, so that a normal balance may be preserved.

Others of the so-called alterative class counteract morbid processes, or influence metabolism in some unknown manner, and are afterwards eliminated from the body. When the true pathology of a long list of diseases becomes known, we shall doubtless reach a better insight into the methods by which this class of drugs modify and cure disease.

Many drugs have the property of stimulating to greater activity the glands through which they pass out of the system, and are of great value in preserving the normal status, or even augmenting the activity of a part during disease.

It is frequently impossible to combat the etiological factor of a disease directly, and one must be content to permit the ailment to run its course. In the meantime, if the avenues of elimination are stimulated to expel from the system the developing toxins and morbid products of disease, the tissues of the body do not become greatly weakened, and reaction and resolution take place rapidly.

Some drugs possess a variety of actions, all of which are not desirable. These peculiarities must be taken strictly into account in general practice; by way of example, it might be stated that castor oil serves as an efficient purge in the dog, but the use of this drug is highly disappointing in that animal if already effected with nausea. Formalin is a very efficient antiferment, but when administered to the horse in gastric flatulence, too often establishes an œsophagitis by being eructed with the accumulated gases, thus making it an unsafe agent.

No agent will relieve the pain and relax the entire muscular system in that dreaded disease hæmoglobinuria like chloral hydrate, but just when recovery seems assured an intractable

nephritis develops, due to the irritating chloralic acid undergoing elimination through the kidneys.

The writer observed a horse not long since suffering from a severe attack of encephalitis. It was impracticable to administer the desired agents in the usual way, so it was decided to give a subcutaneous injection of a preparation containing morphine, hyocine and cactine. The first injection had no apparent effect and it was repeated in due time. In about thirty minutes subsequent to the last injection, the animal was taken with the wildest delirium, and expired shortly afterwards. The practitioner had not reckoned with the delirifacient properties of two of the agents in the preparation, which doubtless would not have asserted themselves in a normal animal.

The field of human medicine is being flooded with proprietary medicines of every description, and even the veterinary branch is being exploited in quite a measure. Many of these private preparations are useful in their place, but they have a baneful effect upon the practitioner who adopts them. Just in proportion to the extent he uses them, just to that extent his knowledge of the true application of drugs for the relief of diseases ceases to grow. He no longer has an incentive to study and to develop, but shrivels and shrinks, and permits some one else to do his thinking for him.

Closely allied to this is the tendency of some practitioners to follow a beaten path, by prescribing some fixed formula that he may have tucked away in his memory, or a convenient note book, for a patient without due regard for present conditions or stage of the disease. Such practices are ruinous to the progress of any man, and should be studiously avoided at the very beginning of practice. It is a sign of early retrogression and if allowed in one's self, will terminate in unpardonable empiricism.

Every member of the veterinary profession should feel it his duty to add something to our fund of therapeutic knowledge; to study medicinal agents with a view of determining their actions on animals, and at all times to attempt to prescribe the particular remedy needed at that particular time of the examination. By

following this method a greater proficiency will not only be attained in diagnosis, but in the healing art as well, and as one becomes accustomed to the progress and peculiarities of disease, and its behavior under medicaments at his hand, he becomes impressed with the fact that he is the possessor of a knowledge and a power, that he is able to wield with certainty, for the betterment and relief of the animal kind.

RESOLUTION ON BOVINE TUBERCULOSIS.—Passed at the recent meeting of the Washington State Dairymen's Association.

We, the committee on legislation, to whom were referred all propositions concerning legislation with reference to bovine tuberculosis, beg leave to report as follows:

We favor the amendment of the present law in order to make it include the following points—

First, the compulsory testing of all dairy cattle and the requirement of certification of tuberculin test for all dairy animals sold, except for purposes of immediate slaughter.

Second, the adoption of an official system of marking reacting animals in such a way that they can be definitely identified.

Third, to provide a method of slaughter of reacting animals under state or federal supervision and remuneration for animals so slaughtered to the amount of twenty-five (25) dollars for each grade and fifty (50) dollars for each pure-bred animal, with exceptions in case of animals valuable for breeding purposes to be kept in quarantine.

Fourth, the prohibition of the sale or feeding of unsterilized milk from reacting animals.

We further recommend that the State Agricultural College be requested to offer in its farmers' institute and extension work instruction to dairymen in the use of and value of the tuberculin test.—E. E. FLOOD, W. J. LUNN, D. S. TROY, F. E. SMITH, BEN E. HARRISON.—*Horn and Hoof*.

TOXIC PLANTS AND THE POISONING OF ANIMALS.

BY D. ARTHUR HUGHES, LITT.M., PH.D., D.V.M., CHICAGO VETERINARY
COLLEGE, CHICAGO, ILLS.

"Observation and memory are faculties commonly existing together in the same mind: so that he who has extraordinary powers of observation usually has an equally extraordinary memory by means of which he readily recalls the miscellaneous points he has observed."—Lord Kames's "Elements of Criticism."

Something over a year ago I called attention, in this journal, to the prospective appearance of an important work on poisonous plants destructive to domesticated animals, by L. H. Pammel, Ph.D., Professor of Botany, Iowa State College of Agriculture and Mechanic Arts, Ames, Iowa. That work, or rather the first part of the work, has, within a few weeks, come from the press.* My object in writing this note is to call the attention of the profession again to this important work.

Dean Stange's article, in the January, 1911, number of the AMERICAN VETERINARY REVIEW, on Silage Poisoning, valuable as it is, is an instance of articles on poisonous plants which sporadically are printed in our veterinary journals, all of which indicate how very much of a menace toxic plants of various kinds are, and that the sum total of deaths caused by them is very large. This indeed is true as is shown in statistics which have been brought forward by men like Wilcox, Chestnut, Knowles, Glover, Nelson and many others. The wonder is that more information has not been given to veterinary students in our colleges on toxic plants harmful to stock, than has been

* The Torch Press, Cedar Rapids, Ia. The book sells for \$2.50, with postage additional.

done in many since medical botany was made a required subject, for the curricula of recognized colleges, by the combined action of the United States Department of Agriculture and the United States Civil Service Commission. The fact is that Medical Botany should be given even a larger place in the curriculum than is accorded it now. Dr. Pammel's book is a sign of the times. Its appearance is indicative of a need well known to us all; but seldom admitted by many. Poisoning by careless administration of drugs is rather uncommon; at least it only occasionally occurs. It is affected by the ignorant use of drugs by quacks; or else by the bungling of others. But the poisoning of animals by ingestion of poisonous plants, or by the ingestion of herbage rendered toxic by growth of fungi upon it, as in Dean Stange's case, is undoubtedly a very common occurrence. We should have more knowledge of these conditions. Hence the advisability of the publication of such a work as this of Pammel's. When I was at Cornell University as a veterinary student there was no separate course offered us on poisonous plants destructive of live stock—such a course as that given by Professor Pammel to the veterinary students of Iowa State College. It seems to me that such a course should at least be offered in all our colleges, and it would be better if such a course were required.

The part of Pammel's work which has already appeared, the first part, consists of 150 pages octavo, entitled, "A Manual of Poisonous Plants Chiefly of Eastern North America, with Brief Notes on Economic and Medicinal Plants and Numerous Illustrations." Chapter 1 treats of poisons and statistics of poisons. Chapter 2 speaks of bacterial poisons. Chapter 3 is on dermatitis. Chapter 4 deals with forage poisoning, ergotism and aspergillois. Chapter 5 has fungi as its subject, while chapter 6 has to do with equisitosis, locoism and lupinosis. In the few following chapters we find the author dealing with delphinosis, lathyrism, aconitism, veratrim, hydrocyanic poisoning, poisoning from opium, saponins, flowers, honey, and with mechanical injuries of plant origin. In chapter 11 Dr. Pammel

has a classification of poisons, symptoms and antidotes. Chapter 12 is upon the production of poisons in plants. In chapter 13 there is much information on the relation of algae in water to animal disease—a subject of which few veterinarians know much to-day. In chapter 14 is a catalogue of the most important poisonous plants in the United States and Canada. In chapter 15 this part of the work closes with much information on alkaloids, glucosides, gluco-alkaloids, saponins and allied matter.

When finished, Dr. Pammel's work will consist of about 600 pages. Just now we have in the first volume only 150 pages, so that we are left guessing what is yet in store for us. But the indications are that, when completed, we will have something worth the having. There are numerous illustrations scattered throughout the first volume, placed there in order to impress the reader with the appearance of whole plants or portions of plants mentioned in the text. These are helpful in their way. But one cannot help but wish that the author had also incorporated a number of lithographs of the most important of the poisonous plants. The difficulty is that this would increase the cost of a work, which, with the exercise of the most rigid economy, must have been a very costly undertaking.

Bacon, centuries ago, said, in one of his classic essays, reading makes a full man; conversation a ready man; writing an exact man. It is equally true in veterinary practice that careful observation makes an accurate man. Fortunately, as Lord Kames in his "Elements of Criticism" has justly remarked, observation and memory are faculties commonly existing together in the same mind; so that he who has extraordinary powers of observation usually has an equally extraordinary memory by means of which he readily recalls the miscellaneous points he has observed. These are faculties which must be brought into requisition in veterinary practice to save us from numerous errors in diagnosis. Stock owners are so apt to throw up their hands in alarm when a few animals in a flock or herd die from what is believed to be an infection. We are coming to see many such deaths are caused rather by faulty feed than by a

fault in permitting an infection to take place. The ingestion of poisonous plants is being found to be the cause of many losses over widespread areas. Instead of shuddering with alarm at the untoward dispensations of Providence which come as a murrain or plague upon cattle, we are seeing that the debenture must be placed to our own carelessness in allowing the animals to forage on poisonous plants, to eat silage or grains affected with cryptogams, or to drink water alive with alga or fungi, not to say anything about bacteria. Close observations of these things is the preventive of the mistakes in diagnosis of which I have spoken. The remembrance of them distinguishes the veterinarian who has learned the chief facts on poisonous plants destructive to live stock from him who still gropes in outer darkness without this special knowledge to set him to rights. If Dr. Pammel's manual does nothing more than introduce, in book form the subject of poisonous plants to the profession to which we belong, it will have rendered us a service. Certainly a pioneer bookmaker in this field deserves our support. His work can profitably be bought by practitioners, especially those in country practice, everywhere, who are the ones most likely to be puzzled by deaths from causes of which this book treats. I cordially recommend Dr. Pammel's manual to veterinarians of North America; though the completed work, two volumes totalling 600 pages, should be useful for reference and commentary.

THE OHIO HORSE BREEDERS' ASSOCIATION will hold its annual meeting February 9 at 2 p. m. in a room adjoining the corn show on the state fair grounds, Columbus, Ohio. The program will include discussions of the capsule method of breeding and contracts with owners of mares by Ohio breeders. "Breeding Percherons in Ohio" will be discussed by Wayne Dinsmore, secretary of the Percheron Society of America. "The Operation of the Pennsylvania Stallion Law" will be the subject of an address by Dr. C. W. Gay, of Pennsylvania.—*Breeders' Gazette*.

RABIES.

BY DR. JACQUES E. AGHION, VETERINARIAN STATE DOMINION, SAKHA, EGYPT

Rabies is a specific infectious disease affecting warm-blooded animals and more so the dog tribes. It was known and recognized to be a distinct communicable disease many centuries prior to the beginning of the Christian era. The disease is transmitted from animal to animal or from animal to man only through the bite inflicted by a rabid animal, and artificially by inoculating the virus. Experiences show that the blood of rabid animals is free from the virus, but milk and saliva are highly infectious; the virus seems to travel through the nerves to the central nervous system and never through the blood stream, hence the deeper the bite or wound, and the nearer to the head, the greater the danger of a fatal result and the shorter the period of incubation.

Many people, especially Arabs, seem to believe in the applying of a red hot iron to the wound inflicted by the bite of a rabid animal, with the condition that the wound must be kept from water for a period of not less than forty days, and the part above the wound must be vigorously tied up so as to prevent the blood from circulating to the upper part of the body. Bleeding and cauterizing were also practised. But now, thanks to Pasteur's investigations, we become to know better and apply his only reliable method of treatment. Five cases of rabies in dogs were brought to the notice of the writer, and only one case in horses, which I will endeavor to describe.

On June 13, 1910, I was called out to see a gray Arab mare six years old, presenting the following symptoms: Great distress, profuse sweating, difficult breathing, eyes fixed at some

imaginary object, the pupils dilated, mouth partly open with a hanging tongue, difficulty in swallowing, spasm of the throat, head and neck stiff and bent to one side, animal is violently excited, pawing and biting every object in sight. Strange to say that she never attempted to bite her six-months-old colt, which was allowed to go loose about her. She died the second day after exhibiting the above symptoms.

HISTORY OF THE CASE.—The mare has been bitten on the upper lip forty days before any symptoms of rabies were visible. She was bitten by a dog which was shot on the spot on being suspected of rabies.

POST-MORTEM EXAMINATION.—The following findings were present: The stomach congested and contained some foreign bodies such as bits of wood, straw, etc.; liver, spleen, œsophagus and pharynx were badly congested; the tonsils and epiglottis injected; heart practically normal; the mucous membrane of the brain and the spinal cord congested.

THE following was clipped from the *Breeders' Gazette* of January 25, and we regret exceedingly that we cannot present the picture that accompanied it, showing a six-in-hand dog team attached to a fair-sized sleigh:

"An interesting illustration affords a glimpse of conditions in the Soo or Lake Superior country which are ordinarily supposed to obtain in Alaska or the North Pole regions. The picture shows a veterinary surgeon about to start out on his rounds among the great lumbering camps where much work usually awaits his coming. His faithful team of dogs performs wonders, almost miracles, in traversing the woods, often in unbeaten paths from camp to camp.

"Before the coming of the railroads such teams (though greatly inferior in appearance) constituted the motor power of the mail and stage route between Saginaw and the Soo—300 miles—and between the Soo and Marquette, 150 miles. Dog teams are still much used by residents of the Upper Peninsula of Michigan."

REPORTS OF CASES.

TREATMENT OF IMPACTIONS FROM STRAW, HAY AND ALFALFA.

BY WILLIS WILSON, D.V.S., Dayton, Washington.

Among the various articles of extreme interest to the veterinarian contained in the November number of the REVIEW, I have selected the one written on "Impaction from Alfalfa Hay," by Dr. McGinnis as being one that comes closely to meeting with conditions as met by the veterinary practitioner in his daily routine of business.

It seems to be the unwritten law, and a good one too, that the young practitioner should stand aside and leave to his older brother in the profession the duty of delving out the advice and technique to be followed in all things that tend toward the alleviation and cure of the malformations and diseases of our animal friends. Nevertheless I can see no harm in handing out a few suggestions that to me seem to be helpful.

The young man just starting out to build a practice in a community where there is considerable competition (I say competition, for such is often the case regardless of what it should be, is eager and waiting for something new, something that he has never yet tried, that he may be able to increase his efficiency. This constant thirst for new methods is bound at times to cause him to accept things for law that in reality are only theories.

The experience gained by these hasty conclusions are sometimes costly and cause him to study out a few methods for himself which, if they prove successful, I believe should be given out without waiting for riper years of experience, that all may accept or reject at their pleasure.

This matter of impaction from straw, hay, alfalfa, and dry feeds in general, has constituted a very large percentage of the

ills that have come to my attention since practicing, a little less than eighteen months, and I have tried several lines of treatment, but none with such satisfaction as with the old time rectal massage, accompanied with the administration of slowly acting purgatives.

In my opinion a horse suffering from intestinal trouble and presenting a negative or at least doubtful history of his previous care and feed, should seldom if ever receive a dose of medicine before he has first been submitted to a rectal examination.

The indications for the use of our quickly acting purgatives, notably arecoline, eserine, and barium chloride, will, I believe, be very materially reduced if we will only wait a few minutes until a rectal exploration can be made and the exact condition of the bowels be determined.

It would be at best useless and dangerous if not actually criminal to administer a hypodermic purgative to an animal suffering from an impassible intestinal obstruction before the offending mass is broken down or at least softened to such an extent that the increased peristaltic action can be dissipated to an advantageous end. Hyperdermic purgatives undoubtedly fill an important office in veterinary medicine and no progressive veterinarian should be ignorant of their indications and uses, but I believe a great many valuable horses are victims of a too hasty conclusion upon the part of some practitioners regarding their administration.

The technique which I have adopted in this respect is very simple and in my hands has been productive of highly encouraging results.

Take, for instance, an animal that has been kept on dry feed, such as straw, hay, and in my locality, alfalfa hay. He may come with the history of the evacuations being unusually loose and watery, and may in fact show evidence of diarrhoea at the time of making the examination. On this account the owner is generally of the opinion that his animal is affected with some grave ailment of his "water works" and has administered the remedy that never before failed of a cure—nitre. The animal by this time is found to be in considerable pain and is exhibiting the usual severe symptoms. The average case of impaction when the veterinarian is called usually requires something to be done quickly. Here indeed seems to be the place for a hypodermic purgative with the result probably, if given, a dead horse and a lost client who yet thinks his horse's kidneys were at fault.

A much better plan I believe is as follows: After having provided a bucket of warm water, a bar of soap, and a towel, thoroughly soap both arms to the shoulder. Pare the nails closely on both hands and after inserting the arm into the rectum, palpate the intestines thoroughly especially the small colon. If the impaction is found to be either in the small colon or the pelvic flexure of the large colon, it offers a more favorable aspect for what is to follow.

After locating the obstructing mass, either push it to one side against the abdominal wall or grasp it between the thumb on one side and the ends of the fingers on the opposite and by gentle and constant pressure it will be found to yield. Continuing this procedure a channel may be made along the entire side of the mass which will permit of the passage of flatus, and at the same time will allow the softer and watery feces usually anterior to the point of obstruction (due to the presence of enteritis before you were called) to pass along the entire side of the impacted mass and soften it up.

I have had several seemingly hopeless cases to yield to this treatment and go right along to an uninterrupted recovery with nothing more than an ounce dose of fluid extract of aloes in a quart of raw linseed oil.

Sometimes the mass is found to be too resistant to be broken down by this method, and in a few instances I have found it possible to grasp the gut anterior to the mass and by gently squeezing against it as though forcing a ball through a rubber tube by pressure on the outside of the tube, to cause it to move along far enough to become enveloped by a portion of the intestine that has not become paralyzed by pressure and thus to pass along.

One of the disagreeable features of the rectal massage is that it requires the removal of more clothes than is conducive to comfort; especially in an open stable or in the corral. This I have partly overcome, or I should have said, my wife overcame, by removing the sleeves of my undershirts and providing a series of glove fasteners on the shoulders of the shirts and also on the loose sleeves in such a way that they may be worn when needed, and at the same time making it possible to completely bare the arms without the removal of more than the outer shirt. This idea we gladly give to the suffering profession without thought of royalties or patent rights.

INFECTIOUS ANEMIA.

By D. J. HALLORAN, M.D.C., Oconto, Wis.

About August 15, 1910, I was requested by a local lumber company to go up into Michigan a distance of 150 miles to see a herd of horses consisting of sixty-five head, that were at pasture.

Upon arriving four horses were in the barn sick, and they reported three having previously died. I found the following symptoms: Temperature ranging from 104 to 106 degrees; pulse ranging from fifty-eight to seventy-two, quite strong, but very irregular; in some a regular pulse and a typical "pink eye" and a very pronounced staggering gait when moved, and a marked relaxation of the sphincter muscle. The floor of the barn was such that had polyuria been present it would not be noticeable. All retained a fairly good appetite.

I examined the pasture and found conditions favorable except the water. The horses had been drinking from a small stream that had become rather low. A well was dug at once and an abundant supply of apparently good water was obtained. Access to the creek was fenced off.

My diagnosis was "Acute Influenza." I put the sick horses on treatment indicated for influenza, consisting largely of doses of quinine, nux-vom. and echinacea.

I saw the horses ten days later; some of those that were sick on my first visit had returned to pasture, others were taken in sick and one died. On the whole the results were not very satisfactory. I, having a few doses of influenza anti-toxine with me, injected into the blood stream one ounce at a dose and prescribed other treatment.

After that another doctor was called into the case and pronounced the disease "Infectious Anemia," and treated them after that. On account of the distance I did not have advantage of a consultation, and saw no more of the horses until October 22.

A carload consisting of eighteen head was shipped to Oconto for the purpose of putting them to work. They were supposed to be horses that had not developed the disease. After two days in transit I was called again and found six horses presenting the same symptoms that I found on my former visit. I realized then that I had something different than influenza. After reading what literature I could find on "Infectious Anemia" I

concluded it took on a chronic form and the subject would live from three months to a year and many of those horses died within a week after the first symptoms were observed. I was slow to accept the diagnosis of the doctor who called it "Infectious Anemia."

The report at the office were to the effect that they had lost ten head and four more were in such a condition that they expected they would die. They also reported that the horses receiving anti-toxine appeared to do better than those not receiving any.

The disease having run so long and the company sustaining a heavy loss that when the treatment of those eighteen fell again into my hands I was anxious to find out the exact cause of the trouble.

I arranged for a blood count to be made through the kindness of a local physician. I had a count made only after a few days delay on the strength of the favorable report of the anti-toxine.

While waiting I procured a supply from P. D. Co. and gave one ounce direct into the blood stream where the temperature was over 104 degrees and repeated every twelve to twenty-four hours until the temperature returned to 102 degrees. One horse required three doses and this was the only horse that did not suffer a relapse.

Finally, having a blood count made on the horse whose condition indicated that the disease was in a more advanced stage than the others, the count showed 3,712,000 red corpuscles per mm. This confirming the diagnosis of the other doctor.

About this time I called Dr. Clark, of Marinette, who has had considerable experience with infectious anemia, in consultation, and he pronounced them typical cases of infectious anemia and offered valuable suggestions in regard to treatment.

I put the eighteen horses on sulphocorbolates, three tablets in feed t.i.d. and Fowler's Sol. and Tr. Ferri Chlor, in large doses in drinking water, three times a day, and I advised gentle exercise; which, in spite of my protest was soon changed to light work. The horses appeared to be doing very nicely until November 20, when I found three having a temperature of 106 degrees to 106.4 degrees, and a very irregular pulse which was hard to describe.

In leading a horse the length of the barn the pulse would increase one-third, running up to about ninety per minute. I

learned next day that those three horses had been used the day previous in drawing heavy timbers out of the river.

I put them on stimulant treatment and in a week they were playing in the yard and since then have had no more trouble.

At present they are all at light work. I admit this looks like experimental treatment, but the apparent results are so far satisfactory.

There were four horses that received two doses each, and one three doses, and the others only one dose.

The only explanation I can offer is that the influenza antitoxine produced a leucocytosis and in that way prevented recurrence.

I hope to hear from some brother veterinarian who has had some experience with "Infectious Anemia."

As literature on the subject this paper is very meager.

At this date, January 7, 1911, all the horses have been sent to the woods to be put to work.

PEROXIDE IN PNEUMONIA.

By Veterinarian WM. P. HILL, 1st Field Artillery, Ft. Wm. McKinley, P. I.

I notice a report in the October REVIEW on the use of "Peroxide in Pneumonia." I have tried this in one case and had thought up to the time of reading this report that the treatment was original on my part, and intended waiting until I had further chances to test the efficiency of this treatment before reporting results, but as the ice has been broken, I herewith append the particulars of my case, hoping it will be taken up and tried by the practitioner in general practice. This was a troop horse of the 12th cavalry that had had pneumonia for two weeks, and everything had been done to relieve him but with little success. The left lung was consolidated and the right was gradually filling in. Nuclein, tallianine, stimulants and expectorants with hot packs had all been tried and the case pointed to a fatal termination. I then decided to try H_2O_2 intravenously. I put four ounces in a pint and a half of normal salt solution and injected it slowly, using an ordinary Omega rubber syringe with the needle attached by pushing it well into the tube to prevent leaking. I noticed no especial distress from the injection. The temperature was 105 degrees Fahrenheit; in four

hours it dropped to 103 degrees Fahrenheit, and the horse seemed to be brighter. I repeated the dose, when the temperature dropped to 101 degrees Fahrenheit at the end of the fifteenth hour from the first injection. I left the horse for the night and when I saw him the next morning I was agreeably surprised to find him switching flies and eating, neither of which he had done for the last two days. The temperature was up to 103 degrees Fahrenheit. I repeated the intravenous injection and gave him another that evening, leaving him with a temperature of 101 degrees Fahrenheit at night. The next morning he was markedly better, the right lung was clearing up and I thought I heard some resolution in the left; he was much better in spirits, eating grass heartily and everything began to look hopeful. His temperature kept at 101 degrees Fahrenheit. This morning he started a "pea soup" diarrhoea which was weakening him. I gave astringents and stimulants, but with no abatement of the discharge. The next morning he was dead in his box-stall, the attendant informing me he died at 5 a. m. I feel confident that he was well on to the road to recovery when this purgation set in. From the results obtained in this one case I cannot help thinking if I had started this treatment a week sooner I would have a live horse to-day. I hope all who read this will give it a trial and report results. Use a big needle and a long one and push it well into the vein and hold it steady while injecting.

A MONSTROSITY.*

By W. A. McEWAN, M.D.C., Hampshire, Ill.

I was called to see a thoroughbred Holstein cow, having difficult parturition. Labor pains commenced at (6) six a. m., so the owner thought he would assist in the operation; but with fruitless results. After getting head and forefeet through vulva with aid of block and tackle, gave it up for a hopeless case. He did not call me until 12.30 p. m. On arrival I found my patient very much exhausted. I immediately prepared myself and made an examination of the foetus. Finding that the abdominal cav-

* The Doctor kindly sent a photo of above described monster, but it was not sufficiently clear to make a cut from.

ity was grown wrong side out, bowels hanging to foetus, with croup resting on shoulders, and the hind feet coming the same as the front ones, with exception of the left hind foot caught under the pubis; after relieving this difficulty the foetus was delivered with ease, and from all appearances proved to be a full time calf. With aromatic spts., nux and other ordinary treatment, the cow made a complete recovery.

A TYPICAL BLOOD PICTURE OF PERNICIOUS ANEMIA.

By B. F. KAUPP, Fort Collins, Colo.

The photograph shows a typical blood picture of Pernicious Anemia. There was no misleading gait of hind quarters, no profuse staling, no relaxation of the anal muscles or petechia of



the visible mucous membranes. The animal has been rapidly going down in flesh for two months; pale visible mucous membranes, anemic heart rhythm; edema of sheath and hind legs. Blood showed time of coagulation, eight minutes; hemoglobin, 40 per cent.; erythrocytes, 1,865,000; leucocytes, 13,000; polymorphonuclear leucocytes, 30 per cent.; lymphocytes, 69 per cent.; mononuclears, 1 per cent.; eosinophiles, 3 per cent; iodophylia, 2 per cent.

AN INTERESTING CASE.

By C. L. WILHITE D.V.S., Manilla, Iowa.

Bay, two-year-old mare, coach, about 900 pounds. Long-limbed, tall; limbs good shaped and clean. Has been ailing six weeks to my knowledge; have seen the colt four times in that time and there was no noticeable change at any visit. Temperature, 101 degrees Fahrenheit; respiration, 26; pulse, 52; slightly stiff in gait when walking; drags toes of front feet when trotted; appetite good. The *pronounced* symptom is that she crosses the front feet when drinking from a vessel as low as the knees and will go without water rather than drink lower. The pectoralis anticus muscles are contracted and hard. Hair is sleek and eyes bright. There is no soreness on palpation anywhere that I can discover. Treatment: Blister on pectoralis muscles. No results.

DYING IN HARNESS.

Only a fallen horse, stretched out there on the road—
Stretched in the broken shafts, and crushed by the heavy load.
Only a fallen horse, and a circle of wondering eyes
Watching the cruel teamster goading the beast to rise.
Hold! for his toil is over—no more labor for him;
See the poor neck outstretched and the patient eyes grow dim.
See, on the friendly stones how peacefully rests his head,
Thinking, if dumb beasts think, how good it is to be dead.
After the burdened journey, how restful it is to lie
With the broken shafts, and the cruel load—waiting only to die;
Watchers, he died in harness—died in the shafts and straps;
Fell, and the great load killed him; one of the day's mishaps:
One of the passing wonders marking the city road—
A toiler dying in harness, heedless of call or goad.

John Boyle O'Reilly in Our Dumb Animals.

ABSTRACTS FROM EXCHANGES.

ENGLISH REVIEW.

By PROF. A. LIAUTARD, M.D., V.M.

DERMOID CYST OF THE SOFT PALATE WITH CLEFT PALATE [*R. M. Aulten*].—When a foal, this little fellow had exhibited stertorous breathing and occasional return of food by the nose with excessive salivation. A growth was then detected within the fauces, but on account of the small size of the animal's oral cavity, was left alone. The foal could feed well and was otherwise in apparent perfect health. It was only when he had reached about one year that the attention of the author was called to him. Examining the mouth, a growth was detected, hanging on the end of the soft palate, which was besides, cleft. The tumor had been injured by the molars and bleeding at the mouth was the result. The growth was rather movable and at times could not be seen as it had moved back in the pharynx. The animal was cast, the mouth kept open with speculum and the tumor removed with the ecraseur. The cleft palate was left alone. The animal did well and was not apparently disturbed by the split of the palate.—(*Veter. News.*)

INVAGINATION OF THE CAECUM [*Wm. J. Watt*].—This ten-year-old horse has worked for four hours and coming home has shown a little abdominal pain. Nothing abnormal is detected in him. Ordinary treatment is prescribed, but without giving much relief. The next day as he has passed no feces, he receives a hypodermic injection of eserine and pilocarpine, which acts in ten minutes. The horse was relieved of an enormous quantity of liquid matter and was nearly free from pain. For a few days he took some green food and drank a small quantity of water. Then he refuses everything, his pulse runs up to 64, his temperature to 102.5°, and his respirations to 30 in a minute. He dragged on in that condition for about a week and died. Rectal examination made the day before his death, gave the impres-

sion of a considerable quantity of feces accumulated in the colon. On opening the abdomen, in making the autopsy, a large quantity of foetid brown stained exudate was found. The caecum could not be detected until the colon was cut into. It was found full of gelatinous straw-colored material.—(*Veter. Record.*)

CAUSATION OF RICKETS [*Fred. W. Cousens, M.R.C.V.S.*].—After an examination of the etiological theories, the effects of deprivation of exercise and with the results of experiments carried out by the author, in a well illustrated article the following conclusions are presented:

1. Not one of the many theories which have been elaborated to explain the cause of rickets has been universally accepted, and they all lack, not only from the clinical, but also from the experimental aspect, unequivocal proof.

2. It is some error in feeding, which in this country and America is commonly believed to bring about the disease, but it is doubtful; however, if feeding plays any important part in the etiology of rickets, experimentally, the author, like several other observers, have been unable to cause the condition by improper feeding.

3. By confining young dogs and depriving them of exercise, rickets has been invariably induced by our experiments, and that although their diet was beyond suspicion, the air which they breathed pure and their kennels were kept scrupulously clean, whereas control animals allowed exercise, but otherwise similarly treated, did not become affected.

4. Examination of the condition under which rachitic children are reared reveals one constant and invariable factor in their lives, namely, confinement. Alike, then, on clinical and experimental grounds, it is accordingly concluded that confinement with consequent lack of exercise is the main factor in causing the disease —(*Veter. Journ.*)

TUBERCULOSIS IN A SCOTCH TERRIER [*J. F. Craig, M.A., M. R.C.V.S.*].—Interesting case on account of hepatic lesions and symptoms resembling those of ascitis. The dog's abdomen beginning to increase in size was the first manifestation. It is very largely developed and is almost coming in contact with the ground. The mucous membranes are pale and the temperature 101.8°. Appetite and bowels are normal. Heart sounds slightly muffled. Respiration much increased if animal is raised by his hind legs. Palpation does not indicate ascitis. On manipula-

tion a swelling is detected in the anterior part of the abdominal floor. Laparotomy is performed. A large dark swelling, well defined and as large as a man's head presents itself. This is a large abscess, which on being opened leaves its contents escape through the abdominal wound. Attached to the diaphragm, it was developed in connection with the liver, which was found to be the seat of large tuberculous deposits. The animal was then destroyed. The abscess had developed on the posterior face of the liver. There were four smaller abscesses in the left and middle lobes and also in the hepatic structure. The lymphatic glands were enlarged. There was also tubercular peritonitis. Granulations were scattered on the omentum, mesentery, stomach, intestines and diaphragm. One was on the left kidney. The thoracic organs had also tuberculous deposits.—(*Veter Journ.*)

UNUSUAL CASES OF MILK FEVER [*L. M. Magee*].—A cow, advanced in pregnancy, that has gone dry a few days before and is expected to calve in a fortnight, is taken with milk fever and is now in the delirium stage of the disease. The bladder is emptied, and the udder injected with air and the teats ligated for two hours. The next morning the animal is up and in perfect health. She calved a month later. At her next calving she was down again with milk fever, the next day after delivery and with the ordinary same treatment, she recovered on the following day.

In another case, a six-year-old cow; she was found in a field, where she had her calf during the night. She was unable to rise. The usual treatment was applied, and in the afternoon she was able to move to the barn. The next morning she is again prostrated. A gallon and half of urine is taken away from her bladder and the treatment applied again. She got well during the day, but in the following afternoon she had a second relapse. Two and half gallons of urine are taken away from her and she receives the same treatment, which was followed by permanent recovery.—(*Veter. Record.*)

EQUINE PNEUMONIA [*E. M. Perry, F.R.C.V.S.*].—The author had to treat a number of horses in a large stud, some eleven of which had been diseased and five had double pneumonia. These were the sickest and form the subject of this record.

The first of the horses was treated in the usual manner, but unsuccessfully; he died. The second case was severe from the

start. One entire lung was diseased and also the greatest part of the other. Breathing was very distressed, the temperature 105.5° , and as no improvement seemed apparent, notwithstanding the treatment, the author decided to try Nuclein (Parke Davis & Co.). Five cubic centimeters were injected hypodermically. The temperature dropped to 103° the next day. A second injection reduced it to 102° . The animal began to take food and from that time gradually improved and finally recovered.

The three other cases were treated in the same manner and in all the temperature was reduced by Nuclein injections. Another case is also mentioned, where instead of waiting for the critical acme stage of the disease, the injection of nuclein was resorted to at the beginning of the disease and the affection was cut short. A peculiarity is also mentioned in these cases. It is the fact that while the horses had refused the best green food given to them they were willing and anxious to take thistles which were given to them mixed in the grass. The thistles were not fresh, but half dead, as they are usually found in the fields in the early November days.—(*Veter. News.*)

FRENCH REVIEW.

By Prof. A. LIAUTARD, M.D., V.M.

CURIOUS CASE OF STRANGLES [*MM. Boudeaud and Demé*]. This horse was four years old and taken suddenly sick. The history of his symptoms and course of his disease is as follows: One morning he is found entirely unable to move in his box. He is dull, depressed, has a temperature of 39.8° , no appetite, respiration accelerated. It is in vain that attempts are made to make him move. Both stifle joints are the seat of a large, warm and painful swelling, which made them look deformed. For four or five days this condition continues. The temperature goes down a little, the respiration remains the same. There is complete anorexia and the swellings are getting somewhat smaller and not so warm. On the sixth day the right hind fetlock is swollen, and there is a slight febrile manifestation. Then the left hind fetlock; those of both fore legs are successfully taken at irregular intervals. The general condition remains

the same and the horse has lost a considerable amount of flesh. On the 20th day severe sore throat with swelling and purulent discharge are developed. The temperature is up to 40.1° and 40.3° . Respiration is 46, and dyspneic. The animal roars loudly. After seven or eight days the symptoms gradually subside and the animal enters in convalescence. This lasted two months and was accompanied with infectious manifestations on some joints.

"The diagnosis and nature of the synovial localizations was suspected on account of the age of the animal and was confirmed by the history of the case. The horse came from a stable where strangles prevailed since several months." The treatment consisted of therapeutic measures: Subcutaneous injections of polyvalent antistreptococcic serum, counter irritation on the articulations and on the throat. Salicylate of sodæ electuaries, fumigations, intravenous injections of tallianine, which did good. Caffeine was administered with strychnia during the convalescence. The hygienic measures were proper use of blankets, good bedding, milk diet and nuclein.—(*Rev. Gener.*)

EPILEPTIC FIT CAUSED BY MOTOR CYCLE [*Dr. Roger, Army Veterinarian*].—While being ridden, a mare is suddenly taken with peculiar symptoms. General shaking of the whole body, eyelids opening and closing over the eyes, which are twisted in the orbits. She can scarcely stand and has to be supported to avoid her falling. She has a tendency to turn in a circle and shows acute nervousness. The author bled her in the jugular vein and as the blood is flowing, the symptoms gradually subside and soon pass away. The mare goes eating.

These manifestations made their appearance a few seconds after the passage of a motor cycle, which passed rapidly very close to the mare. She was so suddenly frightened that she micturated, dropped manure and ground her teeth. This was the only attack the mare ever had. The author is convinced that it was one of epileptiform nature.—(*Rev. Veter.*)

MICROBES IN A SPOTTED EGG [*Mr. Chretien, Sanit. Veter.*].—Looking through an egg by transparency, several dark spots disseminated without any special selective spot are observed. They are spots of dampness, so called. The shell being broken, these dark spots are detected by the presence of marks, intersecting the shell and its lining membrane. Some of these marks are

black and others of chocolate color. The white of the egg is not altered, and the yoke is not adherent to the lining of the shell. The contents of the egg are inoculated to several media and placed in the autoclave at 38° C. The chocolate marks gave rise to a handsome culture of microbes and amongst them an ovoid microbe belonging to the gender *Pasteurella*, which by inoculation to guinea pig was not or at most little pathogenous. The black marks gave also cultures of microbes belonging to the gender *Coli-Bacilli*.—(*Hyg. de la Vian. et du lait.*)

STEER WITH ECHINOCOCCUS IN THE LIVER [*G. Parant*].—Four-year-old steer in good condition has tympanitis since four days. For the last twelve months he has had the same trouble on several occasions; but as these attacks subsided by themselves very rapidly, nothing was thought of them. The animal does not seem much disturbed by its condition. His temperature is normal, the nose is moist and his appetite fair. The left flank projects much on account of gases accumulated in the rumen. Tuberculosis is eliminated by negative tuberculine test. Treatment: Aloes and tartar emetic, and nux vomica; frictions of mustard twice a day. No improvement follows. Steer gets weaker, loses flesh and is sent to the butcher. Post mortem: Near the superior border of the posterior face of the liver there is a large abscess full of caseous greyish pus. It is lined by a thick membrane, which is easily removed. It was a big degenerated echinococcus, which pressed against the œsophagus and promoted the tympanitis.—(*Repert. Veter.*)

COW HAS OBSTRUCTION OF THE POSTERIOR VENA CAVA [*P. Chausse, Sanit. Inspector*].—This Norman cow, aged six years, was in very good condition and presented all the signs of perfect health. She was slaughtered for butchery. Only the liver presented a rather marked distomatous and slightly sclerous condition. On the level with the course of the posterior vena cava, there was a tumor as big as a man's fist. It was an abscess situated just in the middle of the hepatic portion of the vein. The abscess had pus in its center. Its middle portion was thick, yellow and fibrous and its envelopes made greatly by the fibrous wall of the blood vessel. The posterior vena cava was completely obliterated and the circulation was carried out by the sub-hepatic veins surrounding and which came from the various lobes of the liver. Notwithstanding the disturbance of the circulation of

the organ by such condition the hepatic parenchyma presented no alteration in its color. The cause of the obstruction was the abscess formed in the hepatic tissue as they are often found in bovines.—(*Rev. Gener.*)

HYDARTHROSIS OF THE ELBOW [*P. Valade, Army Veterinarian*].—Twelve years old, this horse is very lame on the left fore leg. He walks with great difficulty, drags his toe and carries the leg in abduction. At rest, the knee is bent forward, the phalanges flexed, the scapulo-humeral angle is quite open and that of the forearm flexed. The extensor muscles of the forearm are atrophied. The case appears as one of incomplete paralysis of the radial nerve. The next day it is observed that there is a swelling situated in front of and a little below the point of the olecranon in which fluctuation is detected by pressure. Aseptic puncture is made and 80 c.c. of synovia are extracted. This simple operation was followed by an improvement well marked by the actions of the horse. But this was only of short duration and after a few days another puncture had to be made, removing again 60 c.c. of synovia. Again the same result* was obtained. Relieved for a few days, only the lameness returned as severe as before; and more severe treatment with deep pointed firing was then applied and at last followed by recovery in a month.—(*Rec. de Medec. Veter.*)

INTESTINAL INVAGINATION IN A DOG [*A. Bouquet*].—Watch dog, one year old, very lively and caressing, has lost his appetite since ten days. He has mucous bloody diarrhoea, very offensive. There is also violent tenesmus. His nose is moist; there is no fever, and abdominal palpation is not painful. Treatment: granules of morphine and strychnine, milk and vichy water diet. After five days of this therapeutie no improvement. With the tenesmus is added slight prolapsus of the rectum. The condition grows worse. The tenesmus continues, the prolapsus increases; there is some vomiting, and finally as there seems to be no chance to cure him, the owner asks to have him destroyed. At the post mortem there was found general anemic condition, and in opening the abdomen a kind of sausage-like body was exposed. Situated in front of the cæcum it was made of a portion of the small intestine, containing another which was invaginated with its mucous membrane very thick, red, ecchymosed and ulcerated in some places. The diagnosis had been mislaid by

the absence of the ordinary symptoms of invagination, viz., constipation, vomiting of fecal matter, no puffiness nor pain on examination of the abdomen.—(*Rec. de Medec. Veter.*)

TOO MANY FIGS KILL THE COW [*Mr. A. Castelet*].—Three years old, and eight months pregnant, this cow one evening after her supper got loose and went in a field where a large quantity of figs were drying. She tasted them, liked them, and ate many. The effects were rather disastrous, as she was taken with severe tympanitis. Placed under treatment, the gases subsided and the cow was somewhat comfortable. But the next day she showed alarming symptoms: staggering walk, viscous discharge escapes from the nose and mouth, the pulse is weak and thready, the body is cold, there is no rumination and the animal moans with pain. Treatment is useless, death takes place. Nothing of interest was found at the autopsy, except that the rumen contained between 13 and 15 kilogrammes of figs fermenting and giving enormous quantity of carbonic acid gas.—(*Prog. Vet.*)

ANNO DOMINI.

Minister's son disappeared from the parental roof. Was gone two years, then returned. Told his father he had been studying veterinary medicine. Father disappointed and remarked:

"What! a horse doctor! I intended you, my son, for a more refined calling."

"Well, father, I like it. Have great sympathy for dumb animals and the establishment of veterinary colleges in various parts of the country will extend great advantages to students."

"Well," said the father, "I suppose I shall have to accept the situation. By the way, my parishioners gave me a horse the other day. I would like to have you examine him."

The boy gave the horse one glance and said:

"Father, he is not much of a horse!"

"Well," said the father, "we must not criticise a gift too closely. I have no doubt he is as fine an animal as our Saviour rode into Jerusalem."

The boy opened the animal's mouth and exclaimed:

"Yes, father, I think it is the same one!"—(*The Rider and Driver.*)

CORRESPONDENCE.

TO MEMBERS OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION.

The American Veterinary Medical Association is now in the forty-eighth year of its existence. From this time on until the fiftieth anniversary we should lend every effort to add strength and efficiency to the organization, in order that we may with greater zeal and satisfaction enjoy the half-century retrospect.

During this time the evolution of the veterinarian, and all that pertains to his education and standing, are without precedent. Let us keep right on fighting for our cause until we receive the recognition in the army and elsewhere that is our due.

It seems to me that the principal things we should strive for at this time may be conveniently classed under five heads:

1.—Let us get together—in union there is strength. There is a comparatively small proportion of eligible veterinarians now members of our association. We meet next time in a populous country and will no doubt have a large attendance. A large number of veterinarians will be eligible next year under the five-year clause. Remember that applications for membership must be filed with Secretary Marshall thirty days before the meeting, which will be on August 22-25 at Toronto, Canada. Each Resident State Secretary accepts his appointment with the understanding that he is to make a special effort to secure new members, and to facilitate the work of Secretary Marshall, is expected to proceed at once to secure a list of eligible veterinarians in his state and forward same to Dr. Marshall.

2.—There has been a general complaint, and many practitioners have refused to join the A. V. M. A. because we never have time for discussion of practical things. In making our program this year let us keep this object in view. It will do no harm to try it once. In the conduct of our meeting next August, it is hoped that every member will try and aid the chair-

man to so facilitate business that we may have more time for discussion of common diseases and their treatment.

3.—We have a strong committee on legislation, and it is hoped that every member will make it a point to aid them by "seeing" congressmen and bringing all influence possible to bear in the interest of our army legislation bill.

4.—In the matter of uniformity of degrees, it is absurd having so many degrees all meaning the same thing. Let us resolve to be magnanimous in this matter, and say that we will make the change if the majority vote for some other degree. The cost would be only nominal; the price of a new stone for printing diplomas in some cases. The objections, with selfishness eliminated, are not serious.

5.—The weak link in our veterinary college education is matriculation requirements. The curriculum is very satisfactory for the present; the college year is being extended in some schools and in others an additional year is contemplated. Why not raise the educational standard for matriculation? Not a radical change that would work a hardship, but something commensurate with the standards we have attained in other respects.

These are the things that especially appeal to me, and whether we accomplish much or little, we have at least tried to crystallize some of the things talked about, and I confidently trust in a hearty co-operation of all, that we may attain "the greatest good for the greatest number."

Cordially yours,

GEO. H. GLOVER.

AMES, IOWA, January 9, 1911.

Editors AMERICAN VETERINARY REVIEW, New York, N. Y.

MESSRS.—Under the heading of Bibliography in your December, 1910, issue, you gave a review of "A Text-book on Disease-producing Micro-organisms," especially intended for the use of veterinary students and practitioners, by Maximilian Herzog, M.D. I beg that you give me enough space for what I believe to be a just criticism of this text. The author and

publishers deserve much credit for the mechanical make-up of the text. The illustrations are excellent, fully equal to those used in any text in bacteriology which has been published; among these should be mentioned particularly the cuts illustrating pathologic lesions of specific diseases. The effort to place before English reading veterinary students a text on micro-organisms is most commendable, and the work is, on the whole, well done.

A book to be of service to a student as a text, or to a practitioner as a reference work, must have its subject matter arranged according to some logical system. It should be free from numerous or vital errors, and dogmatic statements; and should treat the *one* subject in a scientific manner. One of three methods of classification might be used, bacteriological, pathological, or preferably the first, but not a mixture of all of them. Further, in a discussion of disputed or unsettled points, the different views should be given. A careful study of this book reveals that this has not always been done. We have had enough poorly and quickly written text books already in veterinary medicine without having any more thrust upon us.

The following comments will, I believe, vindicate these statements: Page 22, par. 1. This is rather puerile for a scientific text for college students, but would make a good introduction to a first lesson in kindergarten work.

On page 25 there is a statement under "Symbiotes" to the effect that in the vagina are to be found acid-producing organisms which prevent infection. Such a condition cannot be one of symbiosis, as an acid reaction destroys spermatozoa.

On pages 24 and 25 the forms "Commensales" and "Symbiotes" are used instead of the commonly accepted *English* forms of commensals and symbions or symbionts.

Page 26, par. 2. Bacteria are said to be closely related to higher fungi, the adjective higher is scarcely correct, as the bacteria are believed to be more closely related to the *lower* fungi.

Page 36, under the heading "Arthrospores" is given a list of pathogenic bacteria producing spores: This should not be included here, as their spores are not arthrospores but endospores.

Page 38, the noun "Thermophil" is used as an adjective.

There would appear to be no logical reason for treating infection, phagocytosis and opsonins in the same chapter and following with a chapter on antibodies. Opsonins and phagocytosis belong with a consideration of antibodies and immunity. The discussion of each topic is in the main excellent, but the arrangement is so illogical that it surely will lead to confusion in the mind of the student. Pages 78 and 79, in discussing the Wasserman test for syphilis in man, the author says: "Since the same principle *may be applied* to diseases of domestic animals," and further "the author has for some time tried to find a chance to apply *his test* to Dourine of horses." It might be well to mention that complement deviation as shown by inhibited hemolysis in a similar procedure with Dourine has already been demonstrated by Landstiner, Möller, Pötzl, Hartoch and Yakimoff.

Pages 193-194. "Wounds, however, which are received under natural conditions, will suppurate unless they are immediately cleansed with antiseptic solutions and dressed to exclude the air and other possible sources of contamination" and it (pyemia or septicopyemia) is *more dangerous* than a septicemia, and recovery is relatively rare. Most practitioners can from their own experience flatly contradict these statements.

Page 195. "The staphylococci, particularly the staphylococcus pyogenes aureus are the causes of all varieties of wound infections such as septicemia, pyemia, endocarditis, septic pneumonia, puerperal fever, bone diseases, etc." Page 198. "The streptococcus pyogenes is the cause of suppurative processes of all kinds, such as septicemia, pyemia, puerperal infection, erysipelas, etc." If these statements are not in conflict, they are at least ambiguous, and must lead to confusion on the part of the student. Page 218, par. 1. This is badly mixed, and the citations are not all correct. Prof. Moore found a bacillus of the hæmorrhagic septicemia group instead and believes the etiology of roup unknown.

Page 321. The author describes Ostertag's streptococcus of abortion in mares as a "short immobile, gram-negative streptococcus," which is ambiguous; is it the single organisms or chains that are short? The bacteriologist would know, of course, but would the student?

Page 366. While such statement is not definitely made, the chapter heading nevertheless gives the impression that pseudo-

tuberculosis is caused by acid-fast organisms, while they are not even grampositive. Acid-fast organisms other than the bacterium tuberculosis are described in the same chapter. The writer fails to find any logic for such ambiguous headings or such a system of classification. Pages 374 and 375. In discussing Johne's disease under heading of pathologic lesions, the author says: "If, however, the disease has been recognized early by microscopic examination and inoculations," and "attempts to cultivate the bacillus, as well as animal inoculations, have so far been unsuccessful." These statements do not agree, and it should have been made clear in the first statement that negative results would follow attempts of inoculation.

Page 379. The author says "whether every case of contagious pneumonia of horses is always due to equine influenza, *i. e.*, to the bacillus bipolaris equisepticus." This does not harmonize with the following statement on page 230; "Hutyra has confirmed the observations of Ligniere, identifying the bacillus equisepticus as the cause of horse influenza, or pink-eye, but other authors still consider the etiology unsettled, and doubt whether this organism is the actual cause." From the latter statement one must believe the etiology of equine influenza unsettled, while the former statement says definitely that it is the bacillus bipolar equisepticus.

Page 399 under the heading of spore formation under number 4. Chlamydspore and gemmæ are synonyms.

Chapter 36 has as a part of its heading "Streptothrix" and "Actinomyces." The two genera, if there are two, are not adequately differentiated; the latter heading is not discussed in this chapter, but in the following.

Chapter 41, the term "Hoof and Mouth disease" should be Foot and Mouth disease. The *hoof* is dead material and can not be diseased; the nomenclature, however, is given correctly on page 445.

Is a discussion of *soil bacteriology* pertinent in a veterinary text?

This by no means completes the list of criticisms that might be offered. They may be summarized in the statement that in many places the arrangement is illogical, like things are not grouped together and that there is need of a systematic elimination of irrelevant material.

This communication is written in the hope that text-books for veterinarians may be written as carefully and as accurately as other books; in order that students and instructors may not find it necessary to look up their subject matter in other works to determine their accuracy, before taking the author seriously.

Very truly yours,

H. S. MURPHY,
Assistant, Veterinary Division, Iowa State College.

HOW OFTEN SHALL HORSES BE FED?—Recently there has been quite an agitation in Seattle over the decision of a prominent transfer company to discontinue the noonday meal of their horses. This decision has brought forth a storm of protest from the drivers, which ended in a general strike of all the teamsters employed by the company.

The subject of how often and how much working horses should be fed is an old one and one on which there is no end of opinions. Nearly all concerns using a large number of teams have their own system of feeding, with rarely any two alike. That many working horses are overfed most of us know, and that many are underfed none will doubt who will stand on the street corners for a short time and watch the passing teams. The system and the amount fed should, as a rule, be determined by the kind of work the horse is doing and the length of time he is allowed after eating to digest his food before resuming work. Horses working eight or ten hours a day are certainly entitled to a midday feed and should have it, providing it is not too heavy and they have half an hour or more rest after eating. Horses should always be watered before feeding and never immediately after. It is most injurious to digestion and is often the cause of colic to allow a horse to drink heavily on a full stomach of grain.—(*Horn and Hoof.*)

OBITUARY.

ARCHER E. PARRY, D.V.S.

Born at Ft. Laramie, Wyoming, about fifty years ago, and living his early life in that state and Colorado, Dr. Parry came to New York in 1887 and entered the American Veterinary College, from which institution he subsequently graduated, receiving the degree of Doctor of Veterinary Surgery. With the exception of the first few years after graduation, when he lived and practiced at Riverhead, L. I., he has practiced in New York City; for some time attending the horses of the Police Department. At the time of his death, he was veterinarian to the United States Army horses stationed at Governor's Island.

Dr. Parry was first taken sick two years ago, but apparently recovered after a year out of practice, and for the past year had resumed his work. He died at the Flower Hospital on December 12th last, where he had been removed a few hours prior to his death, having been suddenly seized with uremic convulsions after returning from an entertainment with his family. The Doctor was a member of Mecca Lodge, Mystic Shrine, Chancellor Walworth Lodge, F. and A. M., Columbian Commandery, and Floral Chapter of the Eastern Star. He also was a member of Roanoke Lodge, Oddfellows, and Queensboro Lodge, Elks. After Masonic services at the Masonic Temple, New York City, he was buried in a Shriner's plot at Kensico. Dr. Parry is survived by a wife and three daughters, the youngest of which is fifteen years old.

DAVID S. JOHNSON, D.V.S.

Dr. David S. Johnson, graduate of the New York-American Veterinary College, class of 1901, died at his home in Hartsdale, N. Y., of pneumonia, on January 10. Dr. Johnson, who was a son of Dr. Samuel K. Johnson, chief veterinarian to the Health Department of New York City, was twenty-nine years old at the time of his death. He leaves a widow.

DR. JOSEPH R. SHAW, of Los Angeles, Cal., died on December 23 last. We learned no details in connection with his death.

SOCIETY MEETINGS.

SOUTHERN ILLINOIS VETERINARY MEDICAL AND SURGICAL ASSOCIATION.

This association met in regular annual session at the City Hall, Centralia, Ill., January 3 and 4, 1911. The regular order of business was transacted.

The election of officers for the ensuing year resulted as follows:

President.—Dr. W. H. Cox, Mason, Ill.

First Vice-President.—Dr. E. E. Downing, Farina, Ill.

Second Vice-President.—Dr. T. M. Treece, Herrin, Ill.

Secretary.—Dr. Frank Hockman, Louisville, Ill.

Treasurer.—Dr. Geo. J. Otke, Aviston, Ill.

The following program was carried out:

Tuesday, January 3.—10.00 a. m., Order of Business; Noon Adjournment; 1.00 p. m., President's Address; 2.00 p. m. "Inflammation of the Liver," Dr. W. H. Cox, Mason; 3.00 p. m., "Inflammation of the Brain," Dr. Wm. Smith, Findlay; 4.00 p. m., "Honesty," Dr. E. E. Downing, Farina; 5.00 p. m., "Cancer in Cattle," Dr. F. Hockman, Louisville; Adjournment; 7.30 p. m., Round Table.

Wednesday, January 4.—8.00 a. m., "Rumenitis," Dr. J. B. Crowell, Marion; 9.00 a. m., "Parturient Apoplexy," Dr. G. J. Otke, Aviston; 10.00 a. m., "Tetanus," Dr. E. Holcomb, Smith-ton; 11.00 a. m., "Canine Distemper," Dr. W. A. McMillan, Centralia; Noone Intermission; 1.00 p. m., "Azoturia," Dr. J. C. Jean, Lick Creek; 2.00 p. m., "Obstetrics," Dr. W. H. May, Nashville; 3.00 p. m., "Dentistry," Dr. F. M. Dillman, Sailor Springs; 4.00 p. m., Adjournment.

The Committee on Arrangements reported the next meeting to be held at the City Hall, Centralia, Ill., August 1, 2 and 3, 1911.

FRANK HOCKMAN,
Secretary.

B. A. I. VETERINARY INSPECTORS ASSOCIATION OF CHICAGO.

The regular monthly meeting of the above association was held on the evening of January 13, 1911, at the "Saddle and Sirloin Club."

Thirteen new members were admitted to active membership.

The association voted to hold the annual banquet on Saturday evening, February 11, 1911, and a committee of arrangements was appointed.

The paper of the evening was presented by Dr. L. E. Day, of the B. A. I. Pathological Laboratory of Chicago. The subject was, "Methods of Infection by Tubercle Bacilli."

The paper evoked quite a general and interesting discussion which was participated in by most of the members.

The next regular meeting will be held the second Friday evening in February at the same place and hour, 8 p. m. At this meeting the annual election of officers will be held.

H. A. SMITH,
Secretary-Treasurer.

RESIDENT SECRETARIES—A. V. M. A.

1910-1911.

UNITED STATES.

- Alabama.—I. S. McAdory, Auburn.
Arizona.—J. C. Norton, Phoenix (Arizona and New Mexico).
Arkansas.—R. R. Dinwiddie, Fayetteville.
California.—David F. Fox, Sacramento.
Colorado.—I. E. Newsom, Fort Collins.
Connecticut.—G. W. Loveland, Torrington.
Delaware.—H. P. Eves, Wilmington.
District of Columbia.—R. P. Steddom, B.A.I., Washington.
Florida.—Thomas J. Mahaffey, Jacksonville.
Georgia.—Wm. A. Scott, Columbus.

- Idaho.—Frank W. Chamberlain, Moscow.
Illinois.—L. A. Merrilat, Chicago.
Indiana.—J. W. Klotz, Noblesville.
Iowa.—Wm. W. Dimock, Ames.
Kansas.—Kirk W. Stouder, Manhattan.
Kentucky.—F. E. Eisenman, Louisville.
Louisiana.—H. G. Patterson, New Orleans, La.
Maine.—A. Joly, Waterville.
Maryland.—Wm. H. Martenet, Baltimore.
Massachusetts.—Francis Abele, Jr., Quincy.
Michigan.—Thomas Farmer, Grand Blanc.
Minnesota.—L. Hay, Faribault.
Mississippi.—James Lewis, Agricultural College.
Missouri.—F. F. Brown, Kansas City.
Nebraska.—P. Juckniess, Omaha.
Nevada.—W. B. Mack, Reno.
New Hampshire.—F. A. Allen, Nashua.
New Jersey.—J. P. Lowe, Passaic.
New Mexico.—J. C. Norton, Phoenix, Ariz. (Arizona and New Mexico).
New York.—John F. De Vine, Goshen.
North Carolina.—Adam Fisher, Charlotte.
North Dakota.—W. F. Crewe, Devil's Lake.
Ohio.—E. H. Shepard, Cleveland.
Oklahoma.—Robert A. Phillips, Oklahoma City.
Oregon.—W. Dean Wright, Portland.
Pennsylvania.—H. Preston Hoskins, Philadelphia.
Philippines.—G. E. Neson, Manila.
Porto Rico.—T. A. Allen, San Juan, P. O. Box 541.
Rhode Island.—T. E. Robinson, Westerly.
South Carolina.—L. Friedheim, Rock Hill.
South Dakota.—J. P. Foster, Huron.
Montana.—A. D. Knowles, Livingston.
Tennessee.—M. Jacobs, Knoxville.
Texas.—Mark Francis, College Station.
Utah.—H. J. Frederick, Logan.
Vermont.—F. A. Rich, Burlington.
Virginia.—George C. Faville, Norfolk.
Washington.—Logan B. Huff, Spokane.
West Virginia.—L. N. Reefer, Wheeling.
Wisconsin.—W. G. Clark, Marinette.
Wyoming.—Otto L. Prien, Laramie.

CANADA.

Nova Scotia.—William Jakeman, Glace Bay.
Alberta.—J. C. Hargrave, Medicine Hat.
British Columbia.—S. F. Tolmie, Victoria.
Saskatchewan.—D. S. Tamblyn, Regina.
Manitoba.—F. Torrance, Winnipeg.
Ontario.—F. C. Genside, Guelph.
Quebec.—M. C. Baker, Montreal.
New Brunswick.—D. McCuiag, McAdam Junction.
Prince Edward Islands.—W. H. Pethick, Charlottetown.

SOUTH AMERICA.

Uruguay.—D. E. Salmon, Montevideo.

AUSTRALIA.

Australia.—J. Desmond, Adelaide.

WESTERN CANADA NOTES.

Many veterinarians on the plains of the Canadian Northwest will regret to learn of the passing of Inspector Harry Ayre, of the Health of Animals, Regina. A Yorkshireman, the son of a doctor, he came to Canada at his majority and took service with the Royal Northwest Mounted Police, seeing the varied work of that admirable force as far north as the Yukon. In the force he attained to the rank of Veterinary Staff Sergeant, and on completion of twenty-five years' service was given the King's long service medal for faithfulness to duty. He was then transferred to the head of a branch about three years ago. An unfortunate driving accident last summer had its sequel in tetanus superinduced on an operation to remove a limb. A Chapter Mason and Anglican, he was noted for his fidelity to friends and duty. He will be sincerely regretted by all who knew him, and sympathy is hereby extended to his wife in her lonely widowhood.

The Veterinary Association of Saskatchewan at the suggestion of one of its members, Dr. A. G. Hopkins, gives its paid-up members the option of a year's subscription to a professional journal. The idea underlying this scheme is two-fold—to induce the reading and studying habit in many who would not

bother to send for a journal, but who will read it with interest if at hand, and also to give the practitioner at a distance some return for his annual fee, the cost of traveling very often precluding attendance at conventions.

It is expected that examinations for the license to practice in Saskatchewan will be held early in the spring. Intending candidates should communicate with Dr. J. J. Morrison, Areola, Sask., for information of the sittings of the board of examiners. At the last sitting three received the license, ten taking the examination. The lure of the West had it appears caused some of the old and out-of-date practitioners from down East to think Saskatchewan a good place in which to start over again. No objection is made to this, only the public must be protected against inferior and poorly educated men—hence the rejections.

Several changes have occurred in the Health of Animals staff in Saskatchewan, the inspector in charge, Dr. A. G. Hopkins, relinquishing official work to manage his farm and give personal attention to his live stock breeding interests.

The usual grist of letters is being received at Regina from intending settlers and their home practitioners asking for information re the passing in of live stock at the Canadian ports of entry. All inquiries should be sent to the Inspector-in-charge, Health of Animals, Regina.

KING'S VETERINARY SURGEON.—Professor W. Owen Williams, of the Veterinary School, University of Liverpool, has been appointed by the Earl of Granard, Master of the Horse, veterinary surgeon to the establishment of His Majesty's stables. Professor Williams held a similar appointment to the late King Edward. —*The Rider and Driver*.

AMERICAN live stock is the leading factor of Agricultural prosperity, and the improved breeds have added wonderfully to the prosperity of the nation. Of our entire agricultural production of \$9,500,000,000, our live stock is \$6,000,000,000. The value of horses alone on farm and in the cities is \$3,500,000,000, and that of cattle, sheep and hogs, \$2,500,000,000.—*Live Stock Journal*.

NEWS AND ITEMS.

DR. JAMES L. ROBERTSON, New York, has returned from Ohio much improved in health.

DR. GEO. H. GLOVER attended the annual banquet of the Iowa State College held in Denver, Colo., Dec. 31, 1910.

DR. F. W. CHAMBERLAIN has been called from Moscow, Idaho, to the chair of anatomy at the Veterinary Division of the Michigan Agricultural College, at East Lansing, Mich.

DR. W. R. O'NEIL and son, of Monrovia, California, were met with the misfortune of being bitten by a rabid dog during Christmas week and are taking Pasteur treatment at Los Angeles.

DR. WALTER W. STEWART, Chihalis, Wash., graduate class 1910 Division of Veterinary Science, Colorado State College, was united in marriage to Miss Bessie Littler, Ft. Collins, Colo., on December 28, 1910.

Hog cholera is so prevalent in the hog raising districts of the Middle West that the serum departments of the biological houses and the state experiment stations have not been able to supply enough serum to cope with the demand.

DR. ROBT. J. FOSTER, veterinarian Twelfth Cavalry, left Ft. William McKinley, P. I., with his regiment for the United States on January 14th. Later advices are to the effect that they will be stationed at Fort Robinson, Neb.

DR. W. HORACE HOSKINS, Philadelphia, fell on the ice on Christmas eve and broke his ankle. This is the first time the doctor has been confined to his bed in thirty years. When we last heard from him he was going about on crutches.

DR. CHARLES C. GOENTNER of the class of 1881, American Veterinary College, died in Philadelphia, January 3d. Through the efforts of his classmate, Dr. W. Horace Hoskins, a floral offering was made by the A. V. M. A., Pa. State Vet. Med. Ass'n and the Keystone Vet. Med. Ass'n; in all of which he was an active member, being a charter member of the last-named organization.

At the annual meeting of the Veterinary Medical Association of New Jersey at Trenton, January 12th, Dr. Thomas B. Rogers, of Woodbury, was elected president. The other officers were re-elected. This choice of a chief executive for the coming year will undoubtedly increase the activity of the organization. The July meeting will be held at the Agricultural College, New Brunswick.

At the last meeting of the Central Society of Veterinary Medicine, Paris, Professor Liautard was elected to the presidency of that organization. The veterinary profession of America conferred every honor upon Dr. Liautard that was within its gift, during his many years of labor for the elevation and advancement of the profession in the United States, and rejoice anew in this latest recognition from his fellow citizens in France.

THE Veterinary Conference held at the New York State Veterinary College at Ithaca in January proved to be the best of the series. The presence of Principal Grange, of the Ontario Veterinary College, Dean Klein, of the Veterinary Department of the University of Pennsylvania, and Dr. John R. Mohler, Chief of the Pathological Division of the B. A. I., added much to the attractiveness of a program already rich and instructive. Each of these gentlemen gave most excellent addresses.

THE third annual reunion and smoker given by the Veterinary Medical Association of New York City on January 18th was a marked success and completely eclipsed the two previous ones. Eighty-six men sat at the festive board and were entertained in a manner that was thoroughly enjoyed and appreciated. The committee, of which Dr. Charles E. Clayton was chairman, are deserving of much credit, and should be continued indefinitely as an entertainment committee, as they have demonstrated their peculiar adaptability in that direction.

VETERINARY MEDICAL ASSOCIATION MEETINGS.

In the accompanying table the data given is reported by many Secretaries as being of great value to their Associations, and it is to be regretted that some neglect to inform us of the dates and places of their meetings.

Secretaries are earnestly requested to see that their organizations are properly included in the following list :

Name of Organization.	Date of Next Meeting.	Place of Meeting.	Name and Address Secretary.
Alumni Ass'n, N. Y.-A. V. C.....	.....	141 W. 54th St.	J. F. Carey, East Orange, N. J.
American V. M. Ass'n.....	Aug. 22-25, 1911.	Toronto, Can.	C. J. Marshall, Philadelphia.
Arkansas Veterinary Ass'n.....	.....	.....	Horace E. Rice, Little Rock.
Ass'n Médicale Veterinaire Française "Laval".....	1st and 3d Thur. of each month	Lec. Room, Laval Un'y, Mon.	J. P. A. Houde, Montreal.
B. A. I. Vet. In. A., Chicago.....	2d Fri. ea. mo.	Chicago.....	H. A. Smith, Chicago, Ill.
B. A. I. Vet. In. A., So. Omaha.....	3d Mon. ea. mo.	S. Omaha, Neb.	E. J. Jackson, So. Omaha.
California State V. M. Ass'n.....	.....	San Francisco.	J. J. Hogarty, Oakland.
Central Canada V. Ass'n.....	.....	Ottawa.....	A. E. James, Ottawa.
Central N. Y. Vet. Med. Ass'n.....	June and Nov.	Syracuse.....	W. B. Switzer, Oswego.
Chicago Veterinary Society.....	2d Tues. ea. mo.	Chicago.....	D. M. Campbell Chicago.
Colorado State V. M. Ass'n.....	.....	.....	M. J. Woodliffe, Denver.
Connecticut V. M. Ass'n.....	1st Tues. Feb. '11	Hartford.....	B. K. Dow, Willimantic.
Genesee Valley V. M. Ass'n.....	.....	.....	J. H. Taylor, Henrietta.
Georgia State V. M. A.....	.....	.....	P. F. Bahnsen, Americus.
Hamilton Co. (Ohio) V. A.....	.....	.....	Louis P. Cook, Cincinnati.
Illinois State V. M. Ass'n.....	.....	.....	J. H. Crawford, Harvard.
Indiana Veterinary Association.....	.....	.....	E. M. Bronson, Indianapolis.
Iowa Veterinary Ass'n.....	.....	.....	H. C. Simpson, Denison.
Kansas State V. M. Ass'n.....	.....	.....	B. Rogers, Manhattan.
Kentucky V. M. Ass'n.....	.....	.....	D. A. Piatt, Lexington.
Keystone V. M. Ass'n.....	.....	.....	E. H. Yunker, Phila.
Louisiana State V. M. Ass'n.....	.....	.....	E. P. Flower, Baton Rouge.
Maine Vet. Med. Ass'n.....	.....	.....	C. L. Blakely, Augusta.
Maryland State Vet. Society.....	.....	Baltimore.....	H. H. Counselman, Sec'y.
Massachusetts Vet. Ass'n.....	Monthly.....	Boston.....	J. H. Seale, Salem.
Michigan State V. M. Ass'n.....	Feb. 7, 8, 1911.....	Mich. Agr. Col.	Judson Black, Richmond.
Minnesota State V. M. Ass'n.....	.....	.....	G. Ed. Leech, Winona.
Mississippi State V. M. Ass'n.....	.....	.....	J. C. Robert, Agricultural Col.
Missouri Valley V. Ass'n.....	.....	.....	Hal. C. Simpson, Denison, Ia.
Missouri Vet. Med. Ass'n.....	.....	.....	D. L. Luckey,
Montana State V. M. A.....	.....	Helena.....	W. S. Swank, Miles City.
Nebraska V. M. Ass'n.....	.....	Grand Island.	H. Jensen, Weeping Water.
New York S. V. M. Soc'y.....	Aug. 1911.....	Brooklyn.....	H. J. Milks, Ithaca, N. Y.
North Carolina V. M. Ass'n.....	.....	.....	W. G. Chrisman, Raleigh.
North Dakota V. M. Ass'n.....	.....	.....	C. H. Martin, Valley City.
North-Western Ohio V. M. A.....	Feb. and Nov.....	Lima.....	A. J. Kline, Wauseon.
Ohio State V. M. Ass'n.....	.....	.....	O. V. Brumley, Columbus.
Ohio Soc. of Comparative Med.....	Annually.....	Up'r Sandusky	F. F. Sheets, Van Wert, Ohio.
Oklahoma V. M. Ass'n.....	.....	.....	M. P. Hunt, Enid.
Ontario V. Ass'n.....	.....	.....	C. H. Sweetapple, Toronto.
Passaic Co. V. M. Ass'n.....	Call of Chair.....	Paterson, N. J.	H. K. Berry, Paterson, N. J.
Pennsylvania State V. M. A.....	Mar. 7, 8, 1911.....	Philadelphia.....	F. H. Schneider, Phila.
Philippine V. M. A.....	.....	.....	Chas. G. Thomson, Manila.
Portland Vet. Med. Ass'n.....	4th Tues. ea. mo.	Portland, Ore.	Peter Hanson, Portland, Ore.
Province of Quebec V. M. A.....	.....	Mon. and Que.	Gustave Boyer, Rigaud, P. Q.
Rhode Island V. M. Ass'n.....	Jan. and June.....	Providence.....	J. S. Pollard, Providence
So. Illinois V. M. and Surg. A.....	Aug. 1, 23, 1911.....	Centralia.....	F. Hockman, Louisville.
St. Louis Soc. of Vet. Inspectors.....	1st Wed. fol. the 2d Sun. ea. mo.	St. Louis.....	Wm. T. Conway, St. Louis, Mo.
Schuylkill Valley V. M. A.....	.....	.....	W. G. Huyett, Wernersville.
Soc. Vet. Alumni Univ. Penn.....	.....	Philadelphia.....	B. T. Woodward, Wash'n, D. C.
South Dakota V. M. A.....	2d Tues. July '11	Watertown.....	S. W. Allen, Watertown.
Southern Auxiliary of California State V. M. Ass'n.....	Jan. Apl. 1y. Oct.	Los Angeles.....	A. D. Hubbell, Los Angeles.
So. St. Joseph Ass'n of Vet. Insp.....	4th Tues. ea. mo.	407 Ill. Ave.....	H. R. Collins, So. St. Joseph
Tennessee Vet. Med. Ass'n.....	.....	.....	A. C. Topmiller, Murfreesboro
Texas V. M. Ass'n.....	Call Exec. Com.	.....	R. P. Marsteller, College Sta.
Twin City V. M. Ass'n.....	2d Thu. ea. mo.	St. P.-Minneap	S. H. Ward, St. Paul, Minn.
Vermont Vet. Med. Ass'n.....	.....	.....	G. T. Stevenson, Burlington.
Veterinary Ass'n of Alberta.....	.....	.....	C. H. H. Sweetapple, For. Saskatchewan, Alta., Can.
Vet. Ass'n Dist. of Columbia.....	3d Wed. ea. mo.....	514—6th St., N. W.....	M. Page Smith, Wash., D. C.
Vet. Ass'n of Manitoba.....	Not stated.....	Winnipeg.....	F. Torrance, Winnipeg.
Vet. Med. Ass'n of N. J.....	July, 1911.....	N. Brunswick.	W. Herbert Lowe, Paterson.
V. M. Ass'n, New York City.....	1st Wed. ea. mo.	141 W. 54th St.	W. Reid Blair, N. Y. City.
Veterinary Practitioners' Club.....	Monthly.....	Jersey City.....	A. F. Mount, Jersey City.
Virginia State V. M. Ass'n.....	.....	.....	W. G. Chrisman, Raleigh.
Washington State Col. V. M. A.....	1st & 3d Fri. Eve.	Pullman.....	R. J. Donohue, Pullman.
Washington State V. M. A.....	.....	Seattle.....	J. T. Seely, Seattle.
Western Penn. V. M. Ass'n.....	1st Wed. ea. mo.	Pittsburgh.....	F. Weitzell, Allegheny.
Wisconsin Soc. Vet. Grad.....	Madison.....	I. P. West, Madison.
York Co. (Pa.) V. M. A.....	E. S. Bausticker, York, Pa.

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